

## **EXHIBIT J**

W.R. GRACE & CO.

TERRY M. SPEAR, Ph.D.

July 29, 2009

IN THE UNITED STATES BANKRUPTCY COURT

FOR THE DISTRICT OF DELAWARE

In re: ) Chapter 11  
 )  
W.R. GRACE & CO., et al., ) Case No. 01-01139 (JKF)  
 ) (Jointly Administered)  
Debtors. )

VIDEOTAPED DEPOSITION OF TERRY M. SPEAR, Ph.D.

Taken at:

Nordhagen Court Reporting

1734 Harrison Avenue

Butte, Montana

July 29, 2009

8:35 a.m.

W.R. GRACE & CO.

TERRY M. SPEAR, Ph.D.

July 29, 2009

<p>1 APPEARANCES OF COUNSEL:</p> <p>2</p> <p>3 FOR THE DEBTOR:</p> <p>4 BRIAN THOMAS STANSBURY 5 Attorney at Law 6 Kirkland &amp; Ellis LLP 7 655 Fifteenth Street, NW 8 Washington, D.C. 20005 9</p> <p>10</p> <p>11 FOR THE LIBBY CLAIMANTS:</p> <p>12 TOM L. LEWIS 13 Attorney at Law 14 Lewis, Slovak &amp; Kovacich, PC 15 P.O. Box 2325 16 Great Falls, Montana 59403-2325 17</p> <p>18</p> <p>19 FOR THE ASBESTOS CLAIMANTS COMMITTEE: 20 (Telephonically) 21 BERNARD S. BAILOR 22 Attorney at Law 23 Caplin &amp; Drysdale, Chtd. 24 One Thomas Circle, NW 25 Washington, DC 20005</p>	<p>1 APPEARANCES (Continued):</p> <p>2</p> <p>3 FOR THE PI FCR:</p> <p>4 (Telephonically) 5 GABRIELLA V. CELLAROSI 6 Attorney at Law 7 Eckert Seamans Cherin &amp; Mellott, LLC 8 1747 Pennsylvania Avenue, N.W. - Suite 1200 9 Washington, DC 20006-4604</p> <p>10</p> <p>11</p> <p>12 FOR MARYLAND CASUALTY:</p> <p>13 (Telephonically) 14 JEFFREY C. WISLER 15 Attorney at Law 16 Connolly Bove Lodge &amp; Hutz LLP 17 The Nemours Building 18 1107 North Orange Street 19 Wilmington, Delaware 19899</p> <p>20</p> <p>21</p> <p>22 Also Present: 23 MORGAN ROHRHOFER, Case Assistant 24 VIDEOGRAPHER: John Nordhagen</p>
<p>1 APPEARANCES (Continued):</p> <p>2</p> <p>3 FOR THE PD FCR:</p> <p>4 (Telephonically) 5 ALAN B. RICH 6 Attorney at Law 7 Alan Rich Law 8 Elm Place 9 1401 Elm Street, Suite 4620 10 Dallas, Texas 75201</p> <p>11</p> <p>12</p> <p>13 FOR THE PI FCR: 14 (Telephonically) 15 KATHLEEN A. ORR 16 Attorney at Law 17 Orrick Herrington &amp; Sutcliffe, LLP 18 Columbia Center 19 1152 15th Street, N.W. 20 Washington, DC 20005</p>	<p>3</p> <p>5</p> <p>1 IN D E X</p> <p>2 Witness: Page: 3 TERRY M. SPEAR, Ph.D.</p> <p>4 Examination by Mr. Stansbury . . . . . 8 5 Examination by Mr. Lewis . . . . . 210 6 Examination by Mr. Stansbury . . . . . 214</p> <p>7</p> <p>8 Videotape No. 1 . . . . . 6 9 Videotape No. 2 . . . . . 66 10 Videotape No. 3 . . . . . 130 11 Videotape No. 4 . . . . . 197</p> <p>12</p> <p>13</p> <p>14 EX H I B I T S</p> <p>15 NO. PAGE DESCRIPTION</p> <p>16 1 66 May 2008 Curriculum Vitae 17 2 67 June 2009 Curriculum Vitae 18 3 74 "Trees as reservoirs" - Spear co-author 19 4 77 Firewood Harvesting Simulations article 20 5 77 Fate of Libby Amphibole Fibers article 21 6 87 Spear Expert Report 22 7 131 Morbidity/Mortality of Vermiculite Miners</p> <p>23</p> <p>24</p> <p>25</p>

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<p style="text-align: right;">6</p> <p>1            TERRY M. SPEAR, Ph.D.      2        WEDNESDAY, JULY 29, 2009; BUTTE, MONTANA      3        ---      4        BE IT REMEMBERED THAT, pursuant to notice, the      5 deposition of Terry M. Spear, Ph.D., was taken at the time      6 and place and with the appearances of counsel hereinbefore      7 noted before Candice L. Nordhagen, Registered Professional      8 Reporter and Notary Public for the State of Montana.      9      10 The following proceedings were had:      11      12        VIDEOGRAPHER: The time is 8:32. We're on the      13 record.      14        This is the videotaped deposition of Dr. Terry      15 Spear, taken by the co-counsel for Debtors and      16 Debtors-in-Possession.      17        This is Case No. 01-01139 (JFK); In re: W.R.      18 GRACE &amp; CO., et al., Debtors.      19        This deposition is being taken on July 29,      20 2009, at Nordhagen Court Reporting; 1734 Harrison Avenue;      21 Butte, Montana.      22        The court reporter is Candi Nordhagen.      23        The videographer is John Nordhagen.      24        Counsel will now introduce themselves, after      25 which the court reporter will swear in the witness.</p>	<p style="text-align: right;">8</p> <p>1            EXAMINATION      2 BY MR. STANSBURY:      3        Q. Good morning.      4        A. Good morning.      5        Q. Would you please introduce yourself for the      6 record.      7        A. My name is Terry Spear.      8        Q. My name is Brian Stansbury and I represent      9 W.R. Grace in this bankruptcy proceeding.      10      You are a doctor, correct?      11      A. Yes.      12      Q. What is your degree in?      13      A. Industrial hygiene.      14      Q. Okay. And where do you currently work?      15      A. At Montana Tech of the University of Montana.      16      Q. Now, Dr. Spear, you've had your deposition      17 taken before, correct?      18      A. Yes.      19      Q. About how many times?      20      A. I don't know. Quite a few; I don't have that      21 number.      22      Q. More than 30?      23      A. Probably.      24      Q. Less than a hundred?      25      A. Probably.</p>
<p style="text-align: right;">7</p> <p>1        MR. STANSBURY: Brian Stansbury of Kirkland &amp;      2 Ellis for W.R. Grace.      3        MR. LEWIS: Tom Lewis, for the Libby      4 claimants.      5        Anybody on line?      6        MR. BAYLOR: Okay. Bernard Baylor, for the      7 Asbestos Claimants Committee.      8        MR. RICH: Alan Rich is on the line for the      9 Property Damage FCR. And if you take down my e-mail, I      10 will e-mail you back my full contact information.      11        It's Alan, A-L-A-N @ alanrich - R-I-C-H - law      12 - L-A-W - dotcom.      13        MS. ORR: This is Kate Orr for the Personal      14 Injury FCR.      15        MS. CELLAROSI: Gabriella Cellarosi for      16 Maryland Casualty.      17        MR. STANSBURY: Anybody --      18        MR. WISLER: Jeffrey Wisler, for Maryland      19 Casualty.      20        MR. STANSBURY: Anybody else? Going once.      21      22        TERRY M. SPEAR, Ph.D.,      23 having been called as a witness by the      24 Debtor, being first duly sworn, was      25 examined and testified as follows:</p>	<p style="text-align: right;">9</p> <p>1        Q. Somewhere in the 50-or-so range?      2        A. I would guess.      3        Q. Okay. So you're familiar with the process,      4 then.      5        A. Yes.      6        Q. All right. I'm just going to go over a couple      7 issues. And if you have any questions, just let me know.      8 First, I would ask that when responding, you do so in a      9 "yes", "no", or audible manner, as opposed to nodding your      10 head or saying "um-hmm", just so we keep the record clean.      11 Is that fair?      12      A. Yes.      13      Q. Also, I will strive at all times not to speak      14 over you; and hopefully, we can avoid you speaking over      15 me, again, for the benefit of the court reporter to keep      16 the record clear. Is that fair?      17      A. That's fair.      18      Q. Okay. Are you under any medication today that      19 would inhibit your ability to answer questions truthfully,      20 honestly, and completely?      21      A. No.      22      Q. Okay. And unless stated otherwise, I'm going      23 to presume that you understood my questions. If at any      24 point I ask a question that for whatever reason you don't      25 understand, please let me know so I can rephrase it or we</p>

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<p>1 can ensure that we're on the same page. Is that fair?</p> <p>2 A. That's fair.</p> <p>3 Q. Okay. You say you're at Montana Tech at the</p> <p>4 University of Montana?</p> <p>5 A. Yes.</p> <p>6 Q. And what is your title?</p> <p>7 A. My title is professor and department head.</p> <p>8 Q. And that's the -- what is the actual, what is</p> <p>9 the department?</p> <p>10 A. The department is the Safety, Health and</p> <p>11 Industrial Hygiene Department.</p> <p>12 Q. Okay. And how long have you worked there?</p> <p>13 A. I have been at Montana Tech for 26 years, I</p> <p>14 think.</p> <p>15 Q. Uninterrupted?</p> <p>16 A. For the most part. Yeah, I haven't had any</p> <p>17 other employment with other companies.</p> <p>18 Q. Okay. What is your educational background?</p> <p>19 A. My, from -- well, my educational background is</p> <p>20 a bachelor's degree in microbiology from the University of</p> <p>21 Montana.</p> <p>22 Q. Is that in Missoula?</p> <p>23 A. Yes.</p> <p>24 Q. Okay.</p> <p>25 A. And then a master's of science degree in</p>	<p>10 12</p> <p>1 small particle technology.</p> <p>2 Q. Okay.</p> <p>3 A. I think those are the main ones.</p> <p>4 Q. Let me just, let me unpack this a bit just so</p> <p>5 I'm clear. We're in the summer right now. So let's say</p> <p>6 last spring, which courses did you teach?</p> <p>7 A. Last spring I taught respiratory protection</p> <p>8 and I believe it was sampling strategies.</p> <p>9 Q. Okay. Let's talk about respiratory</p> <p>10 protection. Could you briefly describe what that class</p> <p>11 entails?</p> <p>12 A. It entails providing -- teaching the students</p> <p>13 how to develop a respiratory protection program, going</p> <p>14 through the different types of respirators, fit testing of</p> <p>15 workers who have to wear respirators, training in</p> <p>16 respiratory protection.</p> <p>17 Q. And in the course of that class, is there any</p> <p>18 point in that class when you deal with, for example,</p> <p>19 asbestos in particular?</p> <p>20 A. Yes.</p> <p>21 Q. How prevalent was that, was asbestos, in the</p> <p>22 discussion in your class?</p> <p>23 A. Well, since I do a lot of work in asbestos, I</p> <p>24 make sure that I cover the topic with the students. And I</p> <p>25 mean it certainly isn't the focus of the class, but we</p>
<p>11 13</p> <p>1 industrial hygiene from the University of Minnesota, and</p> <p>2 then a Ph.D. in industrial hygiene from the University of</p> <p>3 Minnesota.</p> <p>4 Q. When did you get your Ph.D. from the</p> <p>5 University of Minnesota?</p> <p>6 A. It was awarded in 1996, I believe.</p> <p>7 Q. Okay. And was that -- were you still working</p> <p>8 at Montana Tech at the time?</p> <p>9 A. Yes.</p> <p>10 Q. Were you alternating between going to classes</p> <p>11 at the University of Minnesota and coming back to Montana</p> <p>12 Tech, or what was the arrangement?</p> <p>13 A. I did take a leave of absence, I believe it</p> <p>14 was in the late '80s, and went back to Minnesota and took</p> <p>15 classes. And then I -- there were other trips back and</p> <p>16 forth to Minnesota from Montana Tech, not any extended</p> <p>17 trips, but basically traveled back and forth to do</p> <p>18 examinations and such.</p> <p>19 Q. Now, at Montana Tech, are you teaching courses</p> <p>20 right now?</p> <p>21 A. Yes.</p> <p>22 Q. What courses do you teach?</p> <p>23 A. Oh, I, over the years, I've taught many</p> <p>24 different courses. Now I primarily teach courses in</p> <p>25 respiratory protection, courses in sampling strategy,</p>	<p>1 talk about respiratory protection where asbestos is</p> <p>2 concerned.</p> <p>3 Q. Okay. And you said "tree samplings"? Was</p> <p>4 that the other --</p> <p>5 A. Pardon me?</p> <p>6 Q. What was the other course you said?</p> <p>7 A. Sampling strategies.</p> <p>8 Q. Oh, sampling strategies, I'm sorry, I</p> <p>9 misunderstood. Sampling strategies, and what is that?</p> <p>10 A. That's a course involving designing sampling</p> <p>11 strategies for contaminants in the workplace.</p> <p>12 Q. And by that, you mean, for example, taking air</p> <p>13 samples?</p> <p>14 A. Well, yeah. It's not an instrument course.</p> <p>15 You know, that's covered in the sampling course, a</p> <p>16 different course. But it's mainly how do we assure that</p> <p>17 we're collecting representative samples, defining exposure</p> <p>18 groups, and things pertaining to that.</p> <p>19 Q. Do you teach graduate or undergraduate</p> <p>20 students?</p> <p>21 A. Those two classes are graduate classes.</p> <p>22 Q. Okay. Now, other than your coursework at</p> <p>23 Montana Tech, what other work have you done in the past</p> <p>24 ten years related to asbestos in particular?</p> <p>25 A. Other than -- what was the first part of your</p>

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<p>1 question?</p> <p>2 Q. Teaching at Montana Tech. You mentioned 3 respiratory protection, a course which, you know, relates 4 to asbestos exposure. Other than -- and I guess what I'm 5 really trying to get to is: Beyond your role as an 6 educator, what work have you done in the last ten years 7 related to asbestos?</p> <p>8 A. Well, we've been doing research pertaining to 9 asbestos for longer than ten years, since about 2003; 10 consulting work pertaining to asbestos.</p> <p>11 Q. Okay. Now, let's look at the -- if I read -- 12 it would be research work and consulting work. Let's 13 start with the research work. Now, what research projects 14 have you worked on related to asbestos?</p> <p>15 A. The research has involved evaluating asbestos 16 exposure pathways associated with the amphibole asbestos 17 in Libby, and then also doing research pertaining to 18 vermiculite or other asbestos-containing materials within 19 homes.</p> <p>20 Q. And by vermiculite in homes, are you referring 21 to vermiculite attic insulation?</p> <p>22 A. Yes.</p> <p>23 Q. Any other type of vermiculite product in the 24 home that was studied?</p> <p>25 A. No, it was primarily vermiculite attic</p>	<p>14</p> <p>16</p> <p>1 of describing that?</p> <p>2 A. That would be fair.</p> <p>3 Q. Okay. Any other pathways other than asbestos 4 traveling in the ambient air and people kicking up dust 5 around the mine site?</p> <p>6 A. Well, and the transportation of it; the 7 loading of it and the transportation of it.</p> <p>8 Q. Okay. So ambient air, we'll call it "activity 9 that unsettles settled dust." Is that a fair way of 10 describing that?</p> <p>11 A. Yes.</p> <p>12 Q. Okay. And then you said the transportation of 13 it?</p> <p>14 A. Yeah, loading and transportation of it, I 15 believe is what I said.</p> <p>16 Q. And would that refer to loading and 17 transportation involving rail lines?</p> <p>18 A. Well, rail lines or other types of loading, 19 truck loading and things like that, I guess.</p> <p>20 Q. Where was the truck loading occurring?</p> <p>21 A. Well, just basically from the mine and then 22 being transferred down to different points along the 23 highway and then unloading by truck. And so I'm just 24 trying to cover all the different aspects of how they 25 would load it.</p>
<p>1 insulation -- or is primarily vermiculite attic 2 insulation; wall, some wall insulation.</p> <p>3 Q. Oh, vermiculite attic insulation that was put 4 in the walls. Is that what --</p> <p>5 A. Yes.</p> <p>6 Q. Okay. So the asbestos pathways in Libby, 7 which pathways have you studied?</p> <p>8 A. We've been looking primarily at the dispersion 9 of asbestos from the mine site into the forest beyond 10 Libby and into the town of Libby and along transportation 11 corridors.</p> <p>12 Q. Now, is that dispersion in any way ongoing or 13 is it simply studying historical dispersion?</p> <p>14 A. Well, we believe that there's evidence that 15 it's ongoing, but is what we're doing is basically 16 evaluating, trying to determine the boundaries of this 17 contamination, so it's not always easy to tell if it's 18 historical or current.</p> <p>19 Q. Okay. And so the dispersion of the asbestos 20 from the site in the ambient air? Is that --</p> <p>21 A. Well, that was one way it was dispersed was 22 ambient air, and I'm sure it was dispersed through 23 movement by machines and road dust and things like that.</p> <p>24 Q. So that would be human activity in the mine 25 site and surrounding area kicking up dust. Is that a way</p>	<p>15</p> <p>17</p> <p>1 Q. Okay. So transportation loading and 2 unloading, is that a fair way of describing the third 3 pathway?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. Any other pathway for potential 6 exposure in the communities, let's say, in Libby that 7 you've studied?</p> <p>8 A. Not currently, we haven't.</p> <p>9 Q. What about historically?</p> <p>10 A. Well, no, none of the research has involved -- 11 that research has not involved any in-house types of 12 sampling. The vermiculite research has.</p> <p>13 Q. Oh, and that would be -- okay, I understand 14 what you're saying. So when you refer to vermiculite, 15 this is what we were speaking of earlier, which was the 16 Zonolite attic insulation that was in attics and also was 17 in, in some cases, the walls of homes, correct?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. So we can just make that the fourth 20 item on the list where we have asbestos traveling from the 21 mine site from the ambient air; asbestos kicked up around 22 the mine site by human activity; transportation, which 23 includes loading and unloading of vermiculite; and then 24 Zonolite attic insulation in homes. Are there any other 25 pathways of exposure besides those four that you have</p>

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<p>1       studied?</p> <p>2       A. That I have studied, no.</p> <p>3       Q. Okay. Are there any other pathways other than</p> <p>4       those four that you are aware of?</p> <p>5       A. Well, I think there's, again, there's a lot of</p> <p>6       activity that go on in homes that could stir up asbestos</p> <p>7       dust there and create exposures.</p> <p>8       Q. From Zonolite attic insulation or from some</p> <p>9       other source?</p> <p>10      A. Well, it could be from attic insulation or it</p> <p>11      could be from other sources that made their way into the</p> <p>12      home.</p> <p>13      Q. Are you aware of any other sources?</p> <p>14      A. Well, windblown dust.</p> <p>15      Q. Okay. So that would be, again, kind of under</p> <p>16      the first heading which would be asbestos that's blown</p> <p>17      from the air, blown through the air from the mine site.</p> <p>18      Is that what you're referring to there?</p> <p>19      A. That would be one method, yes.</p> <p>20      Q. Okay.</p> <p>21      A. And then transport just by human activity,</p> <p>22      carrying it in on your clothes or your feet.</p> <p>23      Q. Okay. And so this research that you've done,</p> <p>24      on whose behalf was it performed?</p> <p>25      A. The research that we began in 2003 was, was</p>	<p>18</p> <p>1       Q. Okay. So let me write that down real quick.</p> <p>2       The University of the Utah, the harvesting study. And was</p> <p>3       that the study that was published in 2007?</p> <p>4       A. I believe so.</p> <p>5       Q. Okay, okay. What other studies -- what other</p> <p>6       sources of funding were involved with other studies that</p> <p>7       you've published?</p> <p>8       A. Well, the Forest Service is funding the</p> <p>9       studies we're doing for them.</p> <p>10      Q. And which study is that?</p> <p>11      A. The occupational exposure of Forest Service</p> <p>12      workers.</p> <p>13      Q. And have the findings of that study been</p> <p>14      published in a paper?</p> <p>15      A. Not yet.</p> <p>16      Q. Okay. The work you've done for the Forest</p> <p>17      Service, is it in any way bearing on your opinions in this</p> <p>18      case?</p> <p>19      A. Yes.</p> <p>20      Q. Is it something that you have produced, these</p> <p>21      findings that you have? Have you taken samples?</p> <p>22      A. Yes.</p> <p>23      Q. When did you take these samples?</p> <p>24      A. I believe it was -- we did the initial Forest</p> <p>25      Service sampling or study last summer, not this summer but</p>
<p>19</p> <p>1       funded through a COBRE Grant, the University of Montana.</p> <p>2       Q. And which, so I'm clear, which was the 2003</p> <p>3       research?</p> <p>4       A. That's doing the Libby work.</p> <p>5       Q. So all those, all four categories you were</p> <p>6       speaking of earlier, all that's been funded by a grant</p> <p>7       through the University of Montana that was issued in 2003?</p> <p>8       A. Well, in part.</p> <p>9       Q. In part.</p> <p>10      A. It began with funding from COBRE, the</p> <p>11      University of Montana, and then there was some funding</p> <p>12      provided from the University of Utah to do some later work</p> <p>13      in the more recent years.</p> <p>14      Q. And which work was that, the more recent work</p> <p>15      in later years you mentioned?</p> <p>16      A. We've been working with the Forest Service to</p> <p>17      determine potential occupational exposure within their</p> <p>18      jobs within the forest around the mine.</p> <p>19      Q. Okay. And this work was what was ultimately</p> <p>20      published in a series of papers, correct?</p> <p>21      A. Yes. In fact, let me correct myself a little</p> <p>22      bit here.</p> <p>23      Q. Okay.</p> <p>24      A. The University of Utah funded the initial</p> <p>25      firewood harvesting simulation study.</p>	<p>19</p> <p>1       last summer.</p> <p>2       Q. And this is in Lincoln County?</p> <p>3       A. Yes.</p> <p>4       Q. Okay. How many samples did you take?</p> <p>5       A. Boy, that's a -- we do a series of air</p> <p>6       sampling, personal air sampling; and then we also do wipe</p> <p>7       sampling of Tyvek clothing they were wearing for</p> <p>8       protection.</p> <p>9       Q. And personal air sampling, is that often</p> <p>10      abbreviated PBZ?</p> <p>11      A. Yes.</p> <p>12      Q. Okay. And that's "personal breathing zone";</p> <p>13      is that right?</p> <p>14      A. Yes.</p> <p>15      Q. Okay. So you do personal breathing zone</p> <p>16      sampling. And then you said "wipe sampling"?</p> <p>17      A. Yes.</p> <p>18      Q. What is wipe sampling?</p> <p>19      A. Wipe sampling is wiping a surface or a garment</p> <p>20      with, basically, an alcohol wipe to remove dust or</p> <p>21      asbestos.</p> <p>22      Q. Okay. So you have done both personal</p> <p>23      breathing zone sampling and wipe sampling for the Forest</p> <p>24      Service. And this was, I believe you said, the summer</p> <p>25      2008, correct?</p>

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<p>22</p> <p>1 A. I believe that's when we did it.</p> <p>2 Q. Do you have an estimate of how many samples</p> <p>3 you took?</p> <p>4 A. Well, I would say the air samples, I would</p> <p>5 estimate that we took -- I don't know if it was in the</p> <p>6 range of 50 samples.</p> <p>7 Q. And what about the wipe samples?</p> <p>8 A. Well, the wipe samples, we used composite</p> <p>9 wipes. So if you count individual wipes, there were</p> <p>10 probably maybe 60 or 70 wipe samples. I don't remember</p> <p>11 the exact numbers.</p> <p>12 Q. And this work that you've done for the Forest</p> <p>13 Service, just so I'm clear, this is not the work that was</p> <p>14 published in the recent publications that you have</p> <p>15 authored related to your work in Libby, correct?</p> <p>16 A. It has not been published yet.</p> <p>17 Q. Okay, not yet. So it's not available to the</p> <p>18 public, then, correct?</p> <p>19 A. That would be correct.</p> <p>20 Q. Okay. However, you say this does inform your</p> <p>21 opinion about potential exposures in Libby?</p> <p>22 A. In and around Libby, yes.</p> <p>23 Q. Okay. How so?</p> <p>24 A. Well --</p> <p>25 MR. LEWIS: Well, wait now. I want to object.</p>	<p>24</p> <p>1 correct?</p> <p>2 A. I'm sorry, what would impact?</p> <p>3 Q. The findings of your work for the forestry</p> <p>4 department. The work you've done for the forestry</p> <p>5 department and the samples taken and your analysis of</p> <p>6 those samples informs your opinion about potential</p> <p>7 exposure somebody would have in the forest around Libby,</p> <p>8 correct?</p> <p>9 A. Well, in terms of Forest Service employees,</p> <p>10 yes.</p> <p>11 Q. Okay. And what are Forest Service employees,</p> <p>12 just so I'm clear?</p> <p>13 A. Well, these are people that work for the</p> <p>14 Forest Service and do work that the Forest Service</p> <p>15 requires them to do.</p> <p>16 Q. And what is that? What kind of work is that?</p> <p>17 A. Well, they do trail maintenance, and they do</p> <p>18 tree measurement, and they evaluate forests for forest</p> <p>19 health, and they have test plots where they evaluate tree</p> <p>20 growth. And that's part of what they do.</p> <p>21 Q. What kind of -- and so when you did --</p> <p>22 A. They fight forest fires.</p> <p>23 Q. So when you did this study, you simulated</p> <p>24 activities, correct?</p> <p>25 A. Yes.</p>
<p>23</p> <p>1 He hasn't said that it forms his opinions in this case.</p> <p>2 It's not a completed study. He hasn't reached final</p> <p>3 opinions. Okay? And it informs his opinions generally,</p> <p>4 but he's not testifying it informs his opinions in this</p> <p>5 case.</p> <p>6 MR. STANSBURY: I will ask going forward you</p> <p>7 not coach the witness through your objections.</p> <p>8 You may answer the question.</p> <p>9 THE WITNESS: Well, yeah, all of the work that</p> <p>10 we do in Libby informs me generally as to the, you know,</p> <p>11 the dispersal of the asbestos in and around Libby.</p> <p>12 Obviously, this work hasn't been published. We haven't</p> <p>13 even finalized the results for the Forest Service</p> <p>14 occupational study, so -- (pause.)</p> <p>15 Q. (By Mr. Stansbury) But you are aware of the</p> <p>16 results, correct?</p> <p>17 A. I'm aware of results.</p> <p>18 Q. And that is something which impacts your</p> <p>19 understanding of potential exposures in and around Libby,</p> <p>20 correct?</p> <p>21 A. Well, this focused on the Forest Service</p> <p>22 occupational study, so it's a narrow -- much narrower than</p> <p>23 the bark studies. Let's put it that way.</p> <p>24 Q. But it would still impact, let's say, forest</p> <p>25 workers working in the forest in and around Libby.</p>	<p>25</p> <p>1 MR. LEWIS: Objection; that's not what he's</p> <p>2 testified to so far.</p> <p>3 Q. (By Mr. Stansbury) I believe your answer to</p> <p>4 the question was "yes"?</p> <p>5 A. For the Forest Service, we simulated the</p> <p>6 activities that they would perform.</p> <p>7 Q. And which activities were those? Just so I'm</p> <p>8 -- you mentioned some activities earlier, but just so I'm</p> <p>9 clear, which activities did you simulate?</p> <p>10 A. We simulated trail maintenance when they're</p> <p>11 clearing trails.</p> <p>12 Q. Okay.</p> <p>13 A. We simulated tree measurement.</p> <p>14 Q. Okay.</p> <p>15 A. We simulated walking through the forest if</p> <p>16 they were walking to get to a stand of trees to evaluate.</p> <p>17 Q. Okay. Anything else?</p> <p>18 A. And we simulated fire line construction.</p> <p>19 Q. What is fire line construction?</p> <p>20 A. If there's a forest fire, and it's the</p> <p>21 constructing of a fire line around the fire.</p> <p>22 Q. How is that constructed? Is it made of --</p> <p>23 what is it made of?</p> <p>24 A. It's done with hand tools.</p> <p>25 Q. Hand tools. And where, generally, did you</p>

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<p style="text-align: right;">26</p> <p>1 conduct these simulations?</p> <p>2 A. The area was probably - let's see if I can get</p> <p>3 my directions right - probably northeast of where the mine</p> <p>4 site was outside of the restricted zone of the mine, and</p> <p>5 essentially between the mine and Lake Koocanusa.</p> <p>6 Q. We might need some help with spelling on that</p> <p>7 one later on.</p> <p>8 Any other research other than what we've discussed</p> <p>9 this morning? Any other asbestos-related research?</p> <p>10 Let me rephrase this: Have you conducted any other</p> <p>11 asbestos-related research other than what we've discussed</p> <p>12 so far this morning?</p> <p>13 A. Let me think for just a second. I don't</p> <p>14 believe so.</p> <p>15 MR. LEWIS: Counsel, I'm not going to coach</p> <p>16 the witness, but I, but I don't know if you intended by</p> <p>17 "research" formal research projects or background research</p> <p>18 many years ago. From the witness's answer, I'm not sure</p> <p>19 he understood the question.</p> <p>20 MR. STANSBURY: That would be coaching the</p> <p>21 witness.</p> <p>22 MR. LEWIS: No, it is not coaching the witness</p> <p>23 sir. I'm trying to clarify the record here. Your</p> <p>24 question was broad. And what do you mean?</p> <p>25 I'll make a formal objection. The question is</p>	<p style="text-align: right;">28</p> <p>1 you done?</p> <p>2 A. Just literature reviews to, in my own mind,</p> <p>3 understand the knowledge of asbestos and the hazard of</p> <p>4 asbestos over time, and how companies were dealing with</p> <p>5 these issues, and things like that.</p> <p>6 Q. When did you first conduct - and I'm going to</p> <p>7 use the term "comprehensive", and if you have any</p> <p>8 question, please feel free to -- I'm happy to clarify.</p> <p>9 When did you first conduct a comprehensive review of</p> <p>10 asbestos literature?</p> <p>11 MR. LEWIS: Object to the form of the question</p> <p>12 on the grounds that it's compound and unintelligible as</p> <p>13 stated.</p> <p>14 THE WITNESS: Yeah, I mean what you consider</p> <p>15 comprehensive, I may not.</p> <p>16 Q. (By Mr. Stansbury) Okay.</p> <p>17 A. I mean to me, that's a confusing word.</p> <p>18 Q. And let's get that, let's figure that out.</p> <p>19 When did you first review any article related to</p> <p>20 asbestos?</p> <p>21 A. Well, probably back in 1978.</p> <p>22 Q. Okay. Do you remember what that was?</p> <p>23 A. I don't remember what it was.</p> <p>24 Q. Okay. When did you first decide to seek out</p> <p>25 asbestos literature specifically for purposes of</p>
<p style="text-align: right;">27</p> <p>1 vague because it refers to "other research" without</p> <p>2 defining what you mean by "other research"; and therefore,</p> <p>3 it's an improper question.</p> <p>4 Q. (By Mr. Stansbury) Dr. Spear, is there any</p> <p>5 other research that you conducted related to asbestos</p> <p>6 other than what we've discussed this morning?</p> <p>7 A. Well, the understanding of our questioning</p> <p>8 along those regard is that you were asking about research</p> <p>9 that we were performing in Libby to collect data and</p> <p>10 publish results.</p> <p>11 Q. Okay, then let's clarify this. And again, to</p> <p>12 the extent that you ever misinterpret or are concerned you</p> <p>13 may be, please feel free to raise it.</p> <p>14 Other than Libby, is there any other research</p> <p>15 related to asbestos generally that you've performed?</p> <p>16 A. Well, I performed literature research of</p> <p>17 asbestos.</p> <p>18 Q. And what is literature research? Does that</p> <p>19 mean reviewing literature?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. But that's not, for example, taking</p> <p>22 samples and analyzing the samples and reaching conclusions</p> <p>23 based on the sampling, correct?</p> <p>24 A. Correct.</p> <p>25 Q. Okay. What type of literature reviews have</p>	<p style="text-align: right;">29</p> <p>1 researching and broadening your understanding of asbestos</p> <p>2 literature?</p> <p>3 A. Probably in 1979.</p> <p>4 Q. And what was the reason for doing that?</p> <p>5 A. Because I was working at a copper smelter in</p> <p>6 Anaconda, and we certainly had asbestos-containing</p> <p>7 materials there. And we had issues that I had to look up</p> <p>8 pertaining to asbestos.</p> <p>9 Q. What kind of articles did you read?</p> <p>10 A. Well, at that time, I'm sure I read the OSHA</p> <p>11 and the NIOSH publications, and some of the textbooks or</p> <p>12 National Safety Council information; Patty's Industrial</p> <p>13 Hygiene and Toxicology, things like that, that provided</p> <p>14 information on asbestos.</p> <p>15 Q. Did you survey epidemiological literature?</p> <p>16 A. I'm sorry?</p> <p>17 Q. Did you read epidemiological literature?</p> <p>18 A. I'm sure I did.</p> <p>19 Q. Okay. Do you recall any studies that you</p> <p>20 reviewed in 1979?</p> <p>21 A. No. I'm sure I saw the Doll study in 1979. I</p> <p>22 don't specifically recall all the articles I looked at in</p> <p>23 1979, I'm sorry.</p> <p>24 Q. Okay. Did you continue -- well, let me</p> <p>25 rephrase that. Do you have any idea of how many articles</p>

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<p style="text-align: right;">30</p> <p>1 you reviewed in 1979?</p> <p>2 A. I don't have. I don't. I can't give you a 3 number. I mean it's many years ago and I don't remember 4 the articles I looked up.</p> <p>5 Q. Okay. Did you stay current with the asbestos 6 literature after 1979?</p> <p>7 A. Yes.</p> <p>8 Q. What publications would you review on an 9 ongoing basis after 1979?</p> <p>10 A. Well, the publications in the American 11 Industrial Hygiene Association Journal and the American 12 Conference of Governmental Industrial Hygiene Association 13 Journal.</p> <p>14 Q. So those are both, as the title would imply, 15 publications aimed at industrial hygiene issues, correct?</p> <p>16 A. Well, yes, I believe that would be correct, 17 then.</p> <p>18 Q. So they would look at things such as exposure 19 levels, sampling methods, issues like that, correct?</p> <p>20 MR. LEWIS: Objection; that's a compound 21 question.</p> <p>22 But you can answer, Doctor.</p> <p>23 THE WITNESS: Well, yeah, I mean it could 24 cover many different aspects. I mean there were -- you 25 know, they would talk about protecting workers through</p>	<p style="text-align: right;">32</p> <p>1 question.</p> <p>2 A. Well, yeah, I'm not a medical doctor. I 3 certainly read medical literature and toxicological 4 literature. I'm not a toxicologist, I mean, but it all 5 informs me concerning the subject matter of asbestos.</p> <p>6 Q. Okay. Well, let's, I guess, then, kind of go 7 through some of the areas where you -- well, some of your 8 qualifications, so to speak, with respect to different 9 aspects of asbestos disease.</p> <p>10 MR. LEWIS: Objection to the form of the 11 question.</p> <p>12 Q. (By Mr. Stansbury) You mentioned that you have 13 no medical training, correct?</p> <p>14 A. Correct.</p> <p>15 Q. Okay. And that would include no training in 16 radiology, correct?</p> <p>17 A. Correct.</p> <p>18 Q. No training in pulmonary medicine generally, 19 correct?</p> <p>20 A. Correct.</p> <p>21 Q. Do you have any experience obtaining exposure 22 histories from a patient?</p> <p>23 A. No.</p> <p>24 Q. And so, of course, you're not able to diagnose 25 patients with asbestos-related disease, correct?</p>
<p style="text-align: right;">31</p> <p>1 sanitation, and clothing, and showers, and things like 2 that. Sure, I mean it would cover not only sampling and 3 standards, but how do we control the exposures.</p> <p>4 Q. Okay. Do these articles --</p> <p>5 A. The Annals of Occupational Hygiene, obviously, 6 too, is another one that was -- that I considered to be 7 important even back in the late '70s.</p> <p>8 Q. But would these publications contain mortality 9 studies of cohorts exposed to asbestos?</p> <p>10 A. They could provide summaries of those types of 11 studies.</p> <p>12 Q. But that would not be the central focus of 13 these articles?</p> <p>14 A. Well, I'm not sure. I mean the -- certainly, 15 a lot of the textbooks and the articles that you're 16 referring to discussed mortality and rates of death from 17 asbestos exposure.</p> <p>18 Q. Okay. What about pulmonary function testing? 19 Was that an area of asbestos medicine that you stayed 20 current on during this time period?</p> <p>21 A. Not really.</p> <p>22 MR. LEWIS: Objection. This witness is not a 23 medical doctor. He's not qualified to testify as to 24 pulmonary studies.</p> <p>25 Q. (By Mr. Stansbury) You may answer the</p>	<p style="text-align: right;">33</p> <p>1 A. Correct.</p> <p>2 Q. Do you have an opinion on whether there is a 3 distinction between individuals who have developed an 4 asbestos disease from exposures in Libby, Montana, as 5 opposed to individuals who have developed an asbestos 6 disease from exposures outside of Libby, Montana?</p> <p>7 MR. LEWIS: Could the court reporter read back 8 the question? It's a long question and I'm not sure I 9 understand it.</p> <p>10 (The pending question was read by the court 11 reporter.)</p> <p>12 MR. LEWIS: Okay. I'm going to object to the 13 form of the question on -- it's vague. The word 14 "distinction", I don't know what you mean by that. 15 Perhaps the witness does, and I'm not going to coach him 16 or interfere with his answer, but the question is vague 17 and overbroad.</p> <p>18 THE WITNESS: I had, you know, I had two 19 questions pertaining to the question. And --</p> <p>20 BY MR. STANSBURY:</p> <p>21 Q. Sure. What were your questions?</p> <p>22 A. What do you mean by, yeah, the distinction 23 between individuals? Are we talking about male versus 24 female?</p> <p>25 Q. Okay.</p>

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34	<p>1       A. And then the second question is: When you say 2 exposure outside of Libby, are we talking about exposure 3 to asbestos, or different types of asbestos, or what are 4 we talking about?</p> <p>5       Q. Good, and I appreciate you asking me about 6 that, any questions you have.</p> <p>7       Obviously, you're aware that people who are exposed 8 to asbestos may develop disease, correct?</p> <p>9       A. Yes.</p> <p>10      Q. And people in Libby have been exposed to 11 asbestos from Libby and developed disease, correct?</p> <p>12      A. Correct.</p> <p>13      Q. And people, let's say, in Pascagoula, 14 Mississippi, have been exposed to asbestos and developed 15 disease from those exposures, correct?</p> <p>16      A. Yes.</p> <p>17      Q. Often asbestos that had nothing to do with 18 Libby, Montana, correct?</p> <p>19      A. That could be correct.</p> <p>20      Q. And those, you know, just from your general 21 review of the medical literature, you are aware that these 22 diseases fall into -- there are different types of 23 diseases associated with asbestos exposure, correct?</p> <p>24      A. Correct.</p> <p>25      Q. Mesothelioma, correct?</p>	36
35	<p>1       A. Yes.</p> <p>2       Q. Lung cancer?</p> <p>3       A. Yes.</p> <p>4       Q. And there are also various forms of 5 non-malignant asbestos-related diseases, correct?</p> <p>6       A. Correct.</p> <p>7       Q. And that could include asbestosis, correct?</p> <p>8       A. Yes.</p> <p>9       Q. Fibrosis of the pleura, correct?</p> <p>10      A. Yes.</p> <p>11      Q. And do you have any opinion as to how any of 12 those diseases would manifest themselves differently in a 13 person whose exposure was to asbestos in Libby as opposed 14 to a person who was exposed to a different type of 15 asbestos outside of Libby?</p> <p>16      A. Yes.</p> <p>17      Q. You have an opinion?</p> <p>18      A. Based on my review of the Libby work and the 19 medical literature.</p> <p>20      Q. What is that opinion?</p> <p>21      A. My opinion is that the asbestos, the amphibole 22 asbestos in Libby seems to be causing a very severe 23 pulmonary fibrosis which is progressive and fast-acting 24 and can lead to death, which is different than what's been 25 seen in other cohorts exposed to different types of</p>	37

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<p>38</p> <p>1 in the medical literature.</p> <p>2 Q. Okay. So from what you're reading in the 3 medical literature, can you identify any piece of 4 literature that would support an opinion that exposure to 5 Libby asbestos would have a greater likelihood of causing 6 interstitial disease as opposed to other forms of 7 asbestos?</p> <p>8 A. I don't.</p> <p>9 Q. Okay. But you do have that opinion with 10 respect to pleural disease, correct?</p> <p>11 A. Yes.</p> <p>12 Q. Okay. So let's focus, then, on pleural 13 disease. Now -- and maybe I should take one quick step 14 back. When we're talking about asbestos from Libby, what 15 is the asbestos from Libby?</p> <p>16 A. Asbestos from Libby is a mixture of 17 amphiboles.</p> <p>18 Q. Which amphiboles?</p> <p>19 A. Well, it's what's been identified as winchite 20 and richterite and tremolite, and then another one that I 21 can't pronounce, riebeckite, or some long name that I 22 don't even try to pronounce.</p> <p>23 Q. Now, are there any difference -- what are the 24 differences between winchite and tremolite?</p> <p>25 A. Well, my -- I'm not a mineralogist, either,</p>	<p>40</p> <p>1 Q. And you, you rely on Meeker, don't you, in 2 your expert report?</p> <p>3 A. Well, I rely on his mineralogy expertise, I 4 guess, yes.</p> <p>5 Q. Okay, okay. So when we're talking about Libby 6 amphibole, we're talking about a mix of these four 7 amphiboles, correct?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. And so if I use the term "Libby 10 amphibole," you understand I'm referring to the four 11 amphiboles found in Libby, Montana, correct?</p> <p>12 A. Yes.</p> <p>13 Q. Okay. So let's go back to the pleural 14 disease. What is your opinion about any differences in 15 the way pleural disease has manifested itself in people 16 exposed to the Libby amphibole?</p> <p>17 A. Well, again, I'm not a toxicologist or a 18 medical doctor, but these are amphiboles. We know that 19 amphiboles, in general, are toxic and cause severe lung 20 disease. And so now we have a combination of amphiboles, 21 and so, obviously, it's going to be toxic. And my opinion 22 basically comes from talking to the doctors in, in Libby.</p> <p>23 Q. Okay. And you kind of led me to where I 24 wanted to go, because your opinions are not based on your 25 training as an industrial hygienist, correct? Your</p>
<p>39</p> <p>1 but my understanding is that they're in the same mineral 2 family, but there's differences in, I think, sodium and 3 potassium for one. But again, I'm not a mineralogist.</p> <p>4 Q. Okay. The same question with respect to 5 richterite. Are you available -- are you aware of any 6 differences between richterite and tremolite?</p> <p>7 A. Well, again, the same mineral family, to my 8 knowledge.</p> <p>9 Q. Okay. The majority of the amphibole in Libby 10 is winchite, correct?</p> <p>11 A. Yes.</p> <p>12 Q. In fact, based on what's in the literature, 13 often tremolite would be as low as 6 percent of the 14 amphibole material in the ore from Libby, correct?</p> <p>15 A. It could be.</p> <p>16 Q. Okay. It could be higher, correct?</p> <p>17 A. Yes.</p> <p>18 Q. But in some cases, over 80 percent was 19 winchite, correct?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. So is it fair to say winchite is the 22 predominant amphibole in the Libby amphibole?</p> <p>23 A. According to Meeker, I believe that would be 24 his assumptions, that it's mostly winchite, followed by 25 richterite, followed by tremolite.</p>	<p>41</p> <p>1 opinions -- let me rephrase that.</p> <p>2 Your opinions about pleural disease in Libby are not 3 based on your training as an industrial hygienist, 4 correct?</p> <p>5 A. Well, we don't get medical training as an 6 industrial hygienist.</p> <p>7 Q. Okay. What specific opinions do you have 8 about pleural disease in Libby? You mentioned them 9 earlier, but I just want to make sure that we're clear 10 about them so we can go over them.</p> <p>11 A. I'm sorry, what --</p> <p>12 Q. You mentioned that you thought pleural disease 13 in Libby was - and again, I'm paraphrasing here, and I'd 14 like you, to the extent that I misstate this, correct it - 15 it's progressive, progresses to death. You mentioned a 16 couple of things about pleural disease in Libby very 17 quickly when we were talking about it earlier, and I just 18 wanted to go over that real quick. If you would, please, 19 identify those.</p> <p>20 A. Well, in reading the literature and talking to 21 Dr. Black specifically, he's seeing in his patients 22 pleural disease which is occurring quicker or manifesting 23 itself sooner than they would normally expect; it's more 24 painful than other types of exposures outside of Libby; it 25 is progressive, they're seeing progression of this</p>

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<p style="text-align: right;">42</p> <p>1 disease; and it can be fatal; it's affecting pulmonary 2 function. 3 Q. So we have pleural disease in Libby that, 4 unlike other pleural disease elsewhere, occurs quicker, is 5 more painful, progressive, and can be fatal. Did I 6 summarize that correctly, sir? 7 A. That's my understanding, yes. 8 Q. Okay. And are these opinions that you intend 9 to offer when you testify? 10 A. Well, I don't know if, if I'm, you know, if 11 I'm allowed to offer anything related to medical. I mean 12 I'm an industrial hygienist. I'm just saying I read the 13 medical literature, I work in Libby, I work with Dr. Black 14 as a technical advisor to the TAG, and I get this 15 information from the doctors. 16 Q. Okay. So -- and I guess because I asked 17 earlier if you had an opinion, and perhaps I should be 18 more specific, when I ask if you have an opinion on this, 19 you may have an opinion on the weather, but do you have an 20 -- is this an opinion that you believe that you can 21 testify about in court? 22 A. I don't even know how to answer your question. 23 I'm not a lawyer. I don't know if I would be allowed to 24 opine that. 25 Q. Do you believe that you are qualified to opine</p>	<p style="text-align: right;">44</p> <p>1 A. Yes. 2 Q. And does that study in any way identify or 3 address the pain involved with pleural disease? 4 A. Not that I know of. 5 Q. Okay. Does it discuss the onset of pleural 6 disease in particular? 7 A. I don't -- I haven't read the article in 8 awhile. You know, it's mainly a mortality study to look 9 at the mortality of workers that worked at the mine. 10 Q. Right. 11 A. So it may not be specific to pleural disease 12 for all I know. 13 Q. Okay, okay. And the Rohs study, that is a 14 study, a follow-up study -- I guess when I say "the Rohs 15 study," we can kind of put Rohs and Lockey together, 16 correct? We're talking about the study of the workers in 17 the O.M. Scott facility in Marysville, Ohio, correct? 18 A. Correct. 19 Q. Okay. So the Lockey/Rohs study, Lockey 20 published in the early '80s, correct? 21 A. Yes. 22 Q. And then Rohs published a follow-up in, I 23 think, either 2007 or 2008, correct? 24 A. Yes. 25 Q. And what about the Rohs study informed your</p>
<p style="text-align: right;">43</p> <p>1 on those issues? 2 A. Well, if, if, you know, reading the medical 3 literature and speaking to doctors in Libby qualifies me, 4 then, yes. 5 Q. Because that would be the extent of your basis 6 for this opinion. It's review of medical literature and 7 discussion -- I think you identified Dr. Black. That was 8 the basis of your opinion about Libby pleural disease, 9 correct? 10 A. Yes. 11 Q. Okay. Which literature have you reviewed to 12 form this opinion? 13 A. Well, different studies by, I guess, Patricia 14 Sullivan, Rohs, Lockey, the Peipens publication, 15 Dr. Whitehouse's publications. 16 Q. So that would be the Sullivan study, the Rohs 17 study, the Lockey study, the Peipens study, and then you 18 mentioned Dr. Whitehouse's publications. Are there any 19 other publications that have informed your opinions about 20 pleural disease in Libby? 21 A. Well, I'm sure there are. Those are the ones 22 that come to mind. I mean it's hard for me to pinpoint 23 specific publications as we sit here. 24 Q. Okay. And the Sullivan study, that is the 25 NIOSH mortality follow-up study, correct?</p>	<p style="text-align: right;">45</p> <p>1 opinion about pleural disease in Libby? 2 A. Well, it's pointing to a greater toxicity of 3 the Libby amphibole, that we're seeing disease in lower 4 concentrations than we have in previous studies pertaining 5 to other types of asbestos. 6 Q. And so just so I'm clear, what she reports are 7 the exposure levels at the Marysville facility, correct? 8 A. Who are we referring to? 9 Q. Rohs. 10 A. Okay. 11 Q. I'll repeat the question. Dr. Rohs reports 12 the exposure levels at the Marysville facility, correct? 13 A. Yes. 14 Q. And she also reports the prevalence of pleural 15 abnormalities among the workers, correct? 16 A. Yes. 17 Q. And she breaks down the population into 18 quartiles, correct, or is it quintiles? 19 A. As far as I remember, yes. I haven't looked 20 at those in awhile, either. 21 Q. But four or five exposure categories, correct? 22 A. Yes. 23 Q. And one of the findings of the studies that 24 she focuses on is that we see pleural abnormalities in the 25 lower exposure quartile, correct?</p>

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<p style="text-align: right;">46</p> <p>1 A. Could you repeat that?</p> <p>2 Q. One of the important findings she addresses in 3 the study was that there were individuals with an elevated 4 level of pleural abnormalities in the lowest exposure 5 quartile, correct?</p> <p>6 A. I believe that's correct.</p> <p>7 Q. Are you aware of any other finding in that 8 study that impacts your understanding of pleural disease 9 from exposure to asbestos in Libby?</p> <p>10 A. Well, I get the Rohs and the Lockey study 11 mixed up, just in my mind, but -- you know, so they saw, 12 in the early years, they saw a certain percentage of 13 people with pulmonary disease. And then they followed 14 these people up after 20-something years, and it went from 15 like 4 percent pleural disease up to 26 percent pleural 16 disease.</p> <p>17 Q. Right, right. And so that's -- the percent 18 you're talking about is the prevalence of pleural 19 abnormalities in the working population, correct?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. But nothing in that study addresses the 22 pain of pleural disease, correct?</p> <p>23 A. Well, that's correct.</p> <p>24 Q. Okay.</p> <p>25 A. I guess they don't have the opportunity to</p>	<p style="text-align: right;">48</p> <p>1 pulmonary abnormalities. And this was among a working 2 population that was working at the time, so I guess from 3 that standpoint. But again, the "quicker" part comes 4 from, again, the discussion with Dr. Black --</p> <p>5 Q. Okay.</p> <p>6 A. -- that we're seeing these things happen 7 quickly.</p> <p>8 Q. So just to be clear, then, the Rohs study does 9 not support an opinion about the onset of Libby pleural 10 disease from first exposure, does it?</p> <p>11 MR. LEWIS: Object to the form of the question 12 using the term "support". It implies something that is 13 not present by his prior answer. To the extent that the 14 question purports to summarize a prior answer, it 15 incorrectly does so and is therefore improper.</p> <p>16 MR. STANSBURY: I'm going to ask that you keep 17 your objections in line with the Federal Rules of Civil 18 Procedure, state them briefly and succinctly to preserve 19 the record, and not coach the witness.</p> <p>20 You man answer, sir.</p> <p>21 MR. LEWIS: I'm going to -- I want to make a 22 statement on the record. There was no coaching there. 23 When I practice before the Federal Courts, I understand 24 that you have to inform the Court of the basis for your 25 objection and not just make some small objection like, "I</p>
<p style="text-align: right;">47</p> <p>1 talk to the patients in Libby.</p> <p>2 Q. Well, the people in Marysville, Ohio, were 3 exposed to Libby amphibole, correct?</p> <p>4 A. Right. But I'm just saying I get this 5 information from Dr. Black who tells me what's --</p> <p>6 Q. Oh, I understand.</p> <p>7 A. -- what's being reported.</p> <p>8 Q. For now let's focus specifically on the 9 literature rather than the conversations with Dr. Black. 10 There's nothing in the Rohs study which addresses the pain 11 involved with Libby pleural disease, correct?</p> <p>12 A. Not that I know of.</p> <p>13 Q. Okay. And the Rohs study was a morbidity 14 study, did not look at mortality, correct?</p> <p>15 A. Right.</p> <p>16 Q. So there is nothing in that study that would 17 support an opinion regarding the fatality involved with 18 Libby pleural disease, correct?</p> <p>19 A. I believe that would be correct.</p> <p>20 Q. And the issue of "occurs quicker", how does 21 the Rohs study impact that opinion?</p> <p>22 A. Well, other than the fact that, you know, it 23 was reported that with time-weighted average exposure 24 levels of, I think it was, 0.3 to 0.4 or 0.5 per cc 25 averaged over an eight-hour day, they were still seeing</p>	<p style="text-align: right;">49</p> <p>1 object to the form of the question." That's improper. 2 And that's all I did, and there was no coaching of the 3 witness in that objection.</p> <p>4 MR. STANSBURY: Again, I'm going to ask you to 5 state the objection succinctly and briefly.</p> <p>6 You may answer the question.</p> <p>7 MR. LEWIS: That was as succinctly and briefly 8 as I could make my objection given the nature of your 9 question.</p> <p>10 THE WITNESS: I think we should back up 11 because I don't know where we were.</p> <p>12 MR. STANSBURY: I think that was his objection 13 in the first place was to create that impression of not 14 knowing where we are.</p> <p>15 MR. LEWIS: I move to strike statement of 16 Counsel on the record. It's improper. He's not a 17 witness. He's a lawyer. He needs to, he needs to shorten 18 up his questions and ask understandable questions so we 19 don't have these objections.</p> <p>20 MR. STANSBURY: Could you read back the last 21 question before the exchange that I had with Mr. Lewis? 22 (The record was read by the court reporter as 23 follows:</p> <p>24 "QUESTION: So just to be clear, then, the 25 Rohs study does not support an opinion about the onset of</p>

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<p style="text-align: right;">50</p> <p>1 Libby pleural disease from first exposure, does it?"</p> <p>2 THE WITNESS: Well, from my recollection, it</p> <p>3 doesn't.</p> <p>4 Q. (By Mr. Stansbury) Okay. And then that leaves</p> <p>5 "progressive." And I guess maybe I should ask you to</p> <p>6 explain what you mean when you say something is</p> <p>7 progressive.</p> <p>8 A. Well, my understanding is that it refers to</p> <p>9 the progression of the disease after the exposure stops.</p> <p>10 Q. And how is this a unique or distinct</p> <p>11 manifestation in Libby?</p> <p>12 A. Well, again, in speaking -- reading the</p> <p>13 medical literature I've read and talking to Dr. Black,</p> <p>14 they believe that it's progressing.</p> <p>15 Q. But if I'm exposed to asbestos working in</p> <p>16 Mississippi, it's chrysotile asbestos, for a few years and</p> <p>17 then my exposures stop, I'm still at risk of developing</p> <p>18 disease, correct?</p> <p>19 A. Well, yes, but it may not progress. It may</p> <p>20 not continue to envelope different portions of the lung.</p> <p>21 Again, I'm not a medical doctor.</p> <p>22 Q. Okay. So again, I think that your</p> <p>23 qualifications here, perhaps this, you know, can close up</p> <p>24 some of this discussion. You're not a medical expert.</p> <p>25 These issues as to whether Libby disease occurs quicker,</p>	<p style="text-align: right;">52</p> <p>1 person fill out a questionnaire, correct?</p> <p>2 A. I believe that's correct.</p> <p>3 Q. And the questionnaire included information</p> <p>4 about the potential exposure pathways, correct?</p> <p>5 A. Yes.</p> <p>6 Q. They also administered an x-ray, correct?</p> <p>7 A. They did.</p> <p>8 Q. And they had those x-rays read by B readers,</p> <p>9 correct?</p> <p>10 A. Right.</p> <p>11 Q. And then they also administered pulmonary</p> <p>12 function tests, correct?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. Are you aware of whether the pulmonary</p> <p>15 function tests results were in the Peipens paper?</p> <p>16 A. I don't. I'd have to review the paper, I</p> <p>17 don't remember.</p> <p>18 Q. Okay. And one of the takeaways from the</p> <p>19 Peipens paper was that approximately 17 percent of the</p> <p>20 screened individuals had pleural abnormalities, correct?</p> <p>21 A. Well, yeah, depending on what group we're</p> <p>22 looking at. They had different percentages.</p> <p>23 Q. But I believe if you looked at just the</p> <p>24 entirety of the population screened, it was approximately</p> <p>25 17 percent, correct?</p>
<p style="text-align: right;">51</p> <p>1 is more painful, is more progressive, or is more fatal,</p> <p>2 these are not issues in which you intend to offer opinions</p> <p>3 at the confirmation hearing?</p> <p>4 MR. LEWIS: Objection; that's a compound</p> <p>5 question.</p> <p>6 THE WITNESS: Well, those, those are my</p> <p>7 opinions based on what my understanding is of the</p> <p>8 situation. And if someone asks me for that opinion, I'd</p> <p>9 just repeat what we did today.</p> <p>10 Q. (By Mr. Stansbury) Okay. And so then we'll</p> <p>11 just tie this up real quick, then. We discussed Sullivan,</p> <p>12 we discussed Rohs and Lockey, and then you mentioned</p> <p>13 Peipens as well, correct?</p> <p>14 A. Yes.</p> <p>15 Q. And that was the published finding of the</p> <p>16 ATSDR screening analysis, correct?</p> <p>17 Let me rephrase that. Peipens' paper was the</p> <p>18 published results of the ATSDR's medical surveillance</p> <p>19 program in Libby in the summers of the 2000 and 2001,</p> <p>20 correct?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. And that study examined individuals by</p> <p>23 giving them a questionnaire, administering an x-ray, and</p> <p>24 examine -- strike that.</p> <p>25 In that medical surveillance, the ATSDR had each</p>	<p style="text-align: right;">53</p> <p>1 A. That could be correct.</p> <p>2 Q. Eleven hundred eighty-six people, does that</p> <p>3 sound about right?</p> <p>4 A. Well, the Peipens study talked about, I</p> <p>5 believe it was 9,000-something --</p> <p>6 Q. Oh, no.</p> <p>7 A. -- people.</p> <p>8 Q. I understand. But did they --</p> <p>9 MR. LEWIS: I object. You promised this</p> <p>10 witness you would not interrupt him and you cut him off in</p> <p>11 his answer.</p> <p>12 Q. (By Mr. Stansbury) Did you have anything else</p> <p>13 to add?</p> <p>14 A. Well, no. You threw a number out there that I</p> <p>15 didn't know where it came from.</p> <p>16 Q. Let me put the number into context. They</p> <p>17 administered x-rays on approximately 6600 people. Does</p> <p>18 that sound about right to you?</p> <p>19 A. That sounds about right.</p> <p>20 Q. And I believe 1,186 were found to have pleural</p> <p>21 abnormalities, correct?</p> <p>22 A. I don't remember the number.</p> <p>23 Q. Okay. How does the Peipens paper inform any</p> <p>24 opinions that you may have about pleural disease in Libby?</p> <p>25 A. Well, the Peipens paper, I think, pointed out</p>

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<p style="text-align: right;">54</p> <p>1 that there is a potential -- there is environmental -- or 2 disease caused from environmental exposure to Libby 3 amphibole. 4 Q. Okay. But that does not -- 5 A. As well as, you know, I mean, basically, the 6 highest rates were in the working population. In their 7 exposure category where they could not identify a pathway, 8 that percentage was 6.7 percent, so that's roughly 3 times 9 higher than what you would expect to find in other types 10 of population-based studies that have been done looking at 11 the prevalence of abnormalities of the lung associated 12 with asbestos. 13 Q. Okay. That paper, however, did not inform 14 your opinion as to whether pleural disease occurs more 15 quickly in Libby, though, correct? 16 A. That's probably correct. 17 Q. Okay. Nor does the Peipens paper inform your 18 opinion as to whether Libby pleural disease was more 19 painful, correct? 20 A. Correct. 21 Q. Does it inform your -- does the Peipens paper 22 inform your opinion as to whether pleural disease in Libby 23 is more progressive? 24 A. Well, I don't know how to answer that 25 question, I guess -- probably not.</p>	<p style="text-align: right;">56</p> <p>1 Q. Okay. Sitting here today, does the 2004 paper 2 in any way inform your understanding as to whether pleural 3 disease in Libby is more painful? 4 A. No. 5 Q. Sitting here today, does the 2004 paper in any 6 way inform your opinion as to whether pleural disease in 7 Libby is more progressive? 8 A. I believe it does, yes. I think that 9 progression is discussed. I don't know if -- I don't 10 remember the specifics of that paper. 11 Q. So sitting here today, you cannot think of a 12 specific way in which that paper informs your 13 understanding of progression of disease in Libby? 14 A. I can't remember specifically how it discusses 15 that topic as I sit here today. 16 Q. Okay. And the 2004 paper by Whitehouse does 17 not inform your opinion about the fatality involved with 18 pleural disease in Libby, correct? 19 A. Not that I know of. 20 Q. Okay. You mentioned on a couple of occasions 21 Dr. Black, your conversations with Dr. Black informed your 22 opinions, correct? 23 A. Yes. 24 Q. And who is Dr. Black? 25 A. Dr. Black works in the card clinic up in</p>
<p style="text-align: right;">55</p> <p>1 Q. Okay. And it certainly doesn't impact your 2 opinion as to whether pleural disease in Libby was more 3 fatal, correct? 4 A. No. 5 Q. Okay. And then you mention Dr. Whitehouse's 6 paper. Which paper was that? 7 A. Well, he's had several. I've looked at 8 several of his recent publications. 9 Q. You published one in 2004, correct? 10 A. Yes. 11 Q. And you also published a paper in 2008 12 regarding mesothelioma, correct? 13 A. Yes. 14 Q. So the 2004 paper, how did that paper inform 15 your opinions as about pleural disease in Libby? 16 A. I believe that in -- Dr. Whitehouse's papers 17 describe the disease rates and the effects on pulmonary 18 function, and I believe the 2004 paper talks about the 19 pleural disease rate, but I could be wrong. 20 Q. Okay. Does it inform your opinion as to 21 whether -- does the Whitehouse 2004 paper inform your 22 opinion as to whether pleural disease occurs more quickly 23 in Libby? 24 A. I don't remember if that was discussed in the 25 paper or not.</p>	<p style="text-align: right;">57</p> <p>1 Libby. 2 Q. What is his role there? 3 A. I believe he's the director or he runs the 4 card clinic. 5 Q. Okay, runs the card clinic. And what kind of 6 doctor is Dr. Black? 7 A. I don't know. 8 Q. Is he a pulmonologist? 9 A. I don't know for sure if he's a pulmonologist. 10 I guess I haven't looked at his resume. 11 Q. Okay. Do you think that's important, what 12 kind of doctor -- a person, a doctor's training, do you 13 think that's relevant to their work as a doctor? 14 A. I suppose it could be, sure. 15 Q. Okay. And sitting here today, you're not 16 aware of any pulmonary training Dr. Black has had, 17 correct? 18 A. No. Like I say, I haven't looked at his 19 resume. 20 Q. Okay. Were you aware that Dr. Black was 21 trained as a pediatrician? 22 A. No. 23 Q. Okay. Do you believe -- okay, so you weren't 24 aware of that. 25 A. No.</p>

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<p style="text-align: right;">58</p> <p>1 Q. Okay. And you weren't aware that he worked at 2 St. John's Hospitals -- St. John's Hospital for many years 3 in pediatrics, correct?</p> <p>4 A. No.</p> <p>5 Q. Okay. You weren't aware that he never did a 6 residency or fellowship in radiology, pulmonary medicine, 7 or occupational medicine, correct?</p> <p>8 A. Correct.</p> <p>9 Q. Okay. But your conversations with him have 10 informed your opinions about pleural disease in Libby?</p> <p>11 A. And what he's seeing in patients that they're 12 screening through the card clinic.</p> <p>13 Q. Okay. Again, though, as you said it earlier, 14 you're not a medical professional. Your opinions are 15 based on conversations with Dr. Brad Black in review of 16 the studies that we mentioned earlier, correct?</p> <p>17 MR. LEWIS: Objection. This is a summary of 18 his testimony. It's improper, it's compound. And 19 therefore, it's an improper question, and I object to the 20 form of the question.</p> <p>21 Q. (By Mr. Stansbury) You may answer.</p> <p>22 A. Yeah, in forming my opinions related to the 23 toxicity of the Libby amphibole, I think is what I said is 24 that those are the articles which I've read most recently, 25 but not all of the articles I've read pertaining to</p>	<p style="text-align: right;">60</p> <p>1 A. Well, the basis of that opinion, again, is my 2 review of the medical literature and scientific journal 3 articles.</p> <p>4 Q. Do you believe that epidemiology should be the 5 basis of establishing which exposure levels can cause 6 disease?</p> <p>7 A. I do believe that is one part of it, but it 8 certainly isn't the only part of it.</p> <p>9 Q. What other parts are there?</p> <p>10 A. Well, there are -- basic clinical studies is 11 another part of it, what is being seen in clinics with 12 patients. Some of that may not appear as an epidemiologic 13 study. And, I guess, other types of studies in different 14 types of plants where they're seeing disease rates or 15 mortality rates that may or may not be considered an 16 epidemiologic study are important from an industrial 17 hygiene standpoint.</p> <p>18 Q. So your opinions on which exposure levels can 19 cause disease are based in part on case reports of disease 20 cases that have occurred in various locations?</p> <p>21 A. In part. That could be part of it, sure.</p> <p>22 Q. Do you give greater weight to an 23 epidemiological study than you would to a case report?</p> <p>24 A. I think if it's a well-done epidemiologic 25 study it would be given more weight.</p>
<p style="text-align: right;">59</p> <p>1 toxicity of asbestos, including Libby amphibole.</p> <p>2 Q. But sitting here today, there's no other 3 article you can think of that informs any opinions you 4 have about any pleural disease in Libby?</p> <p>5 A. No.</p> <p>6 Q. Okay. Do you have any specific opinions 7 about -- let me back up a second. Are you familiar with 8 the term "diffuse pleural thickening"?</p> <p>9 A. Well, I've seen the term.</p> <p>10 Q. Do you have any opinions about diffuse pleural 11 thickening?</p> <p>12 A. No.</p> <p>13 Q. Okay. That's not something you intend to 14 opine about at the confirmation hearing, is it?</p> <p>15 A. No.</p> <p>16 Q. Okay. And you're not an epidemiologist 17 either, correct?</p> <p>18 A. Correct.</p> <p>19 Q. You have no education that qualifies you to 20 opine on epidemiology, correct?</p> <p>21 A. Correct.</p> <p>22 Q. Do you have an opinion on the levels of 23 exposure that cause asbestos-related diseases?</p> <p>24 A. Yes.</p> <p>25 Q. And what is the basis of that opinion?</p>	<p style="text-align: right;">61</p> <p>1 Q. Okay. But your opinion on which exposure 2 levels can cause disease, they're based on your review of 3 literature, correct?</p> <p>4 A. And my, yeah, work with asbestos; my 20 or 30 5 years of an industrial hygienist reading literature.</p> <p>6 Q. But as an industrial hygienist, your role is 7 to focus on the actual exposures themselves and preventing 8 those exposures, correct?</p> <p>9 A. That's a big part of our job, yes.</p> <p>10 Q. Okay. Do industrial hygienists offer opinions 11 in the course of their role as industrial hygienists as to 12 which levels of exposures can cause disease?</p> <p>13 A. Well, if they were seeing disease rates within 14 the plant they're working with, I think their information 15 would be important to establishing what the level of 16 exposure can be that causes disease, sure.</p> <p>17 Q. But what information would that be?</p> <p>18 A. Well, from there, if they're sampling a 19 workplace and they have medical records saying that -- or 20 medical exams showing a certain disease rate in a working 21 population, then, sure, that provides information of 22 exposure that could potentially cause disease.</p> <p>23 Q. But is it the -- strike that.</p> <p>24 Is it the industrial hygienist, though, who would 25 take those exposure data as well as the medical</p>

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<p style="text-align: right;">62</p> <p>1 information and reach an opinion as to whether an exposure      2 has caused disease? Is that the industrial hygienist's      3 role?</p> <p>4 A. No. The industrial hygienist's role would be      5 to provide that data to people that wanted to simulate it      6 and perhaps do an epidemiologic study.</p> <p>7 Q. Okay. So an industrial hygienist is a      8 critical component of developing this epidemiological      9 understanding, correct?</p> <p>10 A. Yes.</p> <p>11 Q. However, the industrial hygienist is -- strike      12 that.</p> <p>13 However, the industrial hygienist's role is to focus      14 on, specifically, the exposure data, correct?</p> <p>15 A. Well, for the most part, making sure we      16 collect representative samples that could be used in an      17 epidemiologic study, as well as controlling the exposure.</p> <p>18 Q. Industrial hygienists clearly don't do the      19 medical examinations themselves, do they?</p> <p>20 A. No.</p> <p>21 Q. Industrial hygienists do not determine      22 toxicity based on mortality compared to exposure levels,      23 correct?</p> <p>24 A. Correct.</p> <p>25 Q. Okay. That's not an industrial hygienist's</p>	<p style="text-align: right;">64</p> <p>1 distribution procedure in this case?</p> <p>2 A. No.</p> <p>3 Q. Okay. So you have no opinion on the medical      4 criteria contained in that TDP, do you?</p> <p>5 A. No.</p> <p>6 Q. And you have not evaluated the exposure      7 treated in that TDP, have you?</p> <p>8 A. No.</p> <p>9 Q. So you intend to offer no opinions about those      10 issues at the confirmation hearing, correct?</p> <p>11 A. No.</p> <p>12 Q. Okay. And you are not offering any opinions      13 specific to the objections stated by the Libby claimants,      14 are you?</p> <p>15 MR. LEWIS: Objection; lack of foundation.      16 I'm not sure he's seen the objections.</p> <p>17 Q. (By Mr. Stansbury) Well, let's establish that.      18 Have you reviewed the objections submitted by the Libby      19 claimants?</p> <p>20 A. No.</p> <p>21 Q. So you have no opinion on those objections, do      22 you?</p> <p>23 A. No.</p> <p>24 Q. Okay. Do you have any opinion regarding the      25 amounts paid in settlement to past Libby claimants?</p>
<p style="text-align: right;">63</p> <p>1 role, is it?</p> <p>2 A. No.</p> <p>3 Q. Okay. Now, you're also not an expert on      4 insurance issues, are you?</p> <p>5 A. No.</p> <p>6 Q. You have no opinion as to Grace's historical      7 insurance policies, correct?</p> <p>8 A. I guess I don't know what you mean by      9 "historical insurance policies." I --</p> <p>10 Q. This is something you know nothing about,      11 correct?</p> <p>12 A. Well, other than, I mean, I've certainly read      13 the Grace exhibits where there are memos from the      14 insurance companies, but I don't know what your question      15 is pertaining to.</p> <p>16 Q. You have no opinion as to how -- well, strike      17 that. You have no --</p> <p>18 MR. LEWIS: We will concede that this witness      19 will not offer any testimony concerning insurance issues      20 in this case.</p> <p>21 Q. (By Mr. Stansbury) Okay, let me ask one more      22 follow-up on that. You have no opinion on what      23 constitutes a product for insurance purposes, do you?</p> <p>24 A. No.</p> <p>25 Q. Okay. Have you reviewed the trust</p>	<p style="text-align: right;">65</p> <p>1 A. What do you mean do I have an opinion?</p> <p>2 Q. Well, I mean do you intend to offer any      3 opinion about the value of past settlements?</p> <p>4 A. No.</p> <p>5 Q. Okay. Do you intend to offer any opinion      6 about the exposures that any individual Libby claimant may      7 have had?</p> <p>8 A. Well, I mean that's what I do is I basically      9 evaluate exposures. So if I was asked to, if I was given      10 information, I guess I could provide an opinion on that.</p> <p>11 Q. Right. So if you had information on a      12 person's exposure, you could evaluate that exposure,      13 correct?</p> <p>14 A. Yes.</p> <p>15 Q. Have you reviewed any of the exposures for any      16 of the Libby claimants?</p> <p>17 A. I don't know who they are, so I don't -- I      18 guess I haven't reviewed them.</p> <p>19 Q. Okay. So sitting here today, you do not      20 intend to offer any testimony about an individual      21 claimant's exposure, do you?</p> <p>22 A. At this time, I guess I haven't seen the      23 claimant, so I don't know what their exposure was.</p> <p>24 MR. STANSBURY: Will you mark this as an      25 exhibit, please? Madam court reporter, if you could mark</p>

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66	<p>1 that as Exhibit 1, please.      2 (Document marked Deposition      3 Exhibit No. 1 for identification.)      4 BY MR. STANSBURY:      5 Q. Dr. Spear, I'm handing you what's been marked      6 as Exhibit 1, which is the CV of Dr. Terry Spear, and it's      7 dated May 2008. Is this your most recent CV?      8 A. No.      9 Q. Okay. When was --      10 A. I have one with me.      11 Q. Oh. Could I get that one, please?      12 A. You bet.      13 Q. Great.      14 MR. LEWIS: We're probably going to need some      15 copies. Would this be a good time to take a break?      16 MR. STANSBURY: Sure, let's take a break.      17 VIDEOGRAPHER: The time is 9:43. We're off      18 the record.      19 (A brief recess was taken.)      20 VIDEOGRAPHER: This is Tape 2 of the      21 videotaped deposition of Dr. Terry Spear.      22 The time is 9:49. We're on the record.      23 MR. STANSBURY: Okay. And so do we have --      24 actually, let's make this Exhibit 2.      25 MS. ROHRHOFER: Oh, really? Okay.</p>	68
67	<p>1 MR. STANSBURY: Yeah, because we still have      2 the old exhibit, we have the old CV as Exhibit 1.      3 (Document marked Deposition      4 Exhibit No. 2 for identification.)      5 BY MR. STANSBURY:      6 Q. So I'm handing you what is marked as Exhibit      7 2, which is your June 2009 CV.      8 A. I'm confused.      9 Q. There was, the May one was 1. That one was 1.      10 A. This is marked 1 but it's 2009.      11 Q. Yeah, we're not going to use old one. We're      12 not going to use the old one. We're going to use the new      13 one instead.      14 (Off-the-record discussion.)      15 BY MR. STANSBURY:      16 Q. So you have a -- according to your CV, your BA      17 is in microbiology, correct?      18 A. Yes.      19 Q. You have a master's in environmental health,      20 correct?      21 A. Yes.      22 Q. And then a Ph.D. in environmental health from      23 the University of Minnesota, correct?      24 A. Yes.      25 Q. Okay. And in your CV under "Related</p>	69

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<p style="text-align: right;">70</p> <p>1 A. Yes.      2 Q. When did that occur, do you recall?      3 A. Again, I believe it would have been in 2005.      4 Q. Okay.      5 A. I don't recall exactly when.      6 Q. Okay. And could you briefly summarize that      7 first face-to-face meeting with Mr. McLean?      8 A. Well, I believe they presented me with the      9 allegations in the trial proceedings and we discussed      10 those. And I believe he asked me if I would be willing to      11 be a witness on, I think -- originally, it was on two of      12 those aspects.      13 Q. Which two aspects?      14 A. I believe, you know, one pertained to      15 sanitation. I don't remember -- both of them pertained to      16 similar things, but -- (pause.)      17 Q. So one was sanitation and the other one?      18 A. I don't remember.      19 Q. But it related to the historical operation of      20 the mine and mill up in Libby?      21 A. Yes, I think that would be fair.      22 Q. Okay. Did you talk to him at all about any of      23 your work regarding the forests around Libby?      24 A. Well, no, because at that time, we'd just      25 begun that work in late '03 and we hadn't published</p>	<p style="text-align: right;">72</p> <p>1 Q. And you also offered opinions about what the      2 industrial hygiene standards were at various times during      3 that operation, correct?      4 A. And I don't remember if we -- if that was part      5 of the opinion. I mean, certainly, it was on standards      6 pertaining to how do we keep materials from leaving the      7 workplace and getting its way into the home.      8 Q. Right. But you also were of the opinion that      9 W.R. Grace had failed to comply with the industrial      10 hygiene standards that were in place at that time,      11 correct?      12 A. Yes.      13 Q. Okay. What were some of the areas where you      14 found W.R. Grace to be lacking?      15 A. Well, No. 1, lack of informing the worker of      16 the hazards of the materials, Libby amphibole that they      17 were working with --      18 Q. Right.      19 A. -- lack of control of the dust, whether it be      20 engineering controls, administrative controls, or personal      21 protective equipment; lack of sanitation or control of      22 dispersion and taking this material home. That's, that      23 was the main part of it.      24 Q. Okay. Did you meet with anybody else from the      25 U.S. Government other than Mr. McLean?</p>
<p style="text-align: right;">71</p> <p>1 anything on that.      2 Q. Did you tell him that was ongoing?      3 A. Well, not then --      4 Q. Okay.      5 A. -- because it wasn't really ongoing.      6 Q. Gotcha.      7 A. I mean it was discussed and we were planning      8 things. We hadn't published anything. I notified him      9 after we had a publication.      10 Q. Okay. And so obviously, you agreed to serve      11 as an expert witness for the Government, correct?      12 A. Yes.      13 Q. And were you paid for your services?      14 A. Yes.      15 Q. What was the paying rate?      16 A. I believe \$150 an hour.      17 Q. And what specific services did you provide for      18 the U.S. Government?      19 A. I provided Mr. McLean with an opinion.      20 Q. In the form of a written report?      21 A. Yes.      22 Q. Okay. And this written report commented on      23 the historical vermiculite mining and milling operation in      24 Libby, correct?      25 A. I believe it did.</p>	<p style="text-align: right;">73</p> <p>1 A. Well, when we had the first meeting, they came      2 over to Montana Tech and there were two other individuals      3 that worked for the EPA, and I don't remember who they      4 were.      5 Q. But they were EPA individuals?      6 A. That's what I understand.      7 Q. Okay. How many times did you meet with      8 Mr. McLean?      9 A. Just once.      10 Q. Okay. And then you submitted a report. Did      11 you have any other conversations with him over the phone?      12 A. I believe we had other phone conversations,      13 just keeping me updated on -- at least initially, like      14 2005, maybe part of 2006.      15 Q. Okay. What about 2008 - 2009? Did you      16 continue a dialogue with Mr. McLean?      17 A. No. The only dialogue would be if we had a      18 publication, I wanted to make sure that there was no      19 conflict of interest in his eyes, so I would send him the      20 fact that we had a paper published pertaining to Libby and      21 just to let him know.      22 Q. So you informed Mr. McLean about these various      23 forest studies that you were doing, correct?      24 A. Yes.      25 Q. And you also informed the publications that</p>

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<p>74</p> <p>1 you were working with the U.S. Government at the time?</p> <p>2 A. I'm sorry, I lost that one.</p> <p>3 Q. Oh. So you mentioned you were concerned about</p> <p>4 a conflict of interest with the Government and you</p> <p>5 disclosed to the Government that you were writing these</p> <p>6 papers, correct?</p> <p>7 A. Yes.</p> <p>8 Q. Did you make a disclosure in the other</p> <p>9 direction as well to these papers that you were testifying</p> <p>10 for the U.S. Government?</p> <p>11 A. I didn't.</p> <p>12 Q. Okay. And just so we're clear, this is --</p> <p>13 we're talking about an article in 2006 that was submitted</p> <p>14 to the International Journal for Scientific Research Into</p> <p>15 the Environment and its Relationship with Human Kind,</p> <p>16 right? Is that your 2006 article? You might have it in</p> <p>17 front of you.</p> <p>18 A. This is what you're referring to?</p> <p>19 Q. May I see?</p> <p>20 A. (Handing document to counsel.)</p> <p>21 MR. STANSBURY: Could we mark this as an</p> <p>22 exhibit, please?</p> <p>23 (Document marked Deposition</p> <p>24 Exhibit No. 3 for identification.)</p> <p>25 BY MR. STANSBURY:</p>	<p>76</p> <p>1 behalf of a plaintiff in a Libby case?</p> <p>2 A. I guess -- I don't remember. It could have</p> <p>3 been the mid 2000s. I don't remember the last time I</p> <p>4 testified.</p> <p>5 Q. Okay. When were you retained in connection</p> <p>6 with this case?</p> <p>7 A. I believe it was 2008.</p> <p>8 Q. 2008. So you had testified in the mid 2000s,</p> <p>9 as you said, on behalf of individuals exposed to asbestos</p> <p>10 from Libby, correct?</p> <p>11 A. To the best of my memory.</p> <p>12 Q. Okay. And at this time, you were working as a</p> <p>13 consultant for the U.S. Government in a criminal trial</p> <p>14 against W.R. Grace involving alleged criminal releases of</p> <p>15 asbestos into the ambient air, correct?</p> <p>16 A. Well, again, takehome exposure is what I was</p> <p>17 asked to testify on.</p> <p>18 Q. Okay.</p> <p>19 A. My testimony, as I understand it, for Kris</p> <p>20 McLean was to basically evaluate how they could have</p> <p>21 controlled asbestos takehome with sanitation procedures.</p> <p>22 Q. And do you have your 2007 article in front of</p> <p>23 you, sir, in your folder?</p> <p>24 A. Is this the firewood harvesting?</p> <p>25 Q. Yes, sir.</p>
<p>75</p> <p>1 Q. So we're looking at "Trees as reservoirs for</p> <p>2 amphibole fibers in Libby, Montana," published 2006. And</p> <p>3 the authors are Tony Ward, Terry Spear, Julie Hart, Curtis</p> <p>4 Noonan, Andrij Holian --</p> <p>5 A. Yeah.</p> <p>6 Q. -- okay, Myron Getman, and James Webber. Did</p> <p>7 I read that correctly, sir?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. And this article - we can discuss it in</p> <p>10 detail a little bit later, but just so I'm clear - this</p> <p>11 article, you examined tree bark to determine the asbestos</p> <p>12 contents in that tree bark, correct?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. And at the time of this article's</p> <p>15 publication, you were working as a consultant to the U.S.</p> <p>16 Government in connection with the criminal case, correct?</p> <p>17 A. Yes.</p> <p>18 Q. Had you also be retained by individuals who</p> <p>19 had lawsuits against W.R. Grace for personal injury</p> <p>20 arising from exposures in and around the mine?</p> <p>21 A. At that time, I don't believe so.</p> <p>22 Q. Okay. Do you recall -- you had testified</p> <p>23 previously, though, on behalf of plaintiffs, correct?</p> <p>24 A. I have, yes.</p> <p>25 Q. When was the last time you had testified on</p>	<p>77</p> <p>1 A. Yes.</p> <p>2 MR. STANSBURY: Okay. Could we mark that as</p> <p>3 an exhibit, please, madam court reporter?</p> <p>4 (Document marked Deposition</p> <p>5 Exhibit No. 4 for identification.)</p> <p>6 BY MR. STANSBURY:</p> <p>7 Q. Exhibit 4 is "Evaluation of Asbestos Exposures</p> <p>8 during Firewood-Harvesting Simulations in Libby, Montana,</p> <p>9 USA - Preliminary Data", by Julie Hart, Tony Ward, Terry</p> <p>10 M. Spear, Kelly Crispen, and Tara R. Zolnikov.</p> <p>11 Did I read that correctly, sir?</p> <p>12 A. Yes.</p> <p>13 Q. And this is published in the "Annals of</p> <p>14 Occupational Hygiene" in 2007. Is that correct, sir?</p> <p>15 A. Yes.</p> <p>16 Q. Okay. And in this paper, you're looking at</p> <p>17 activities that could occur in the forest and potential</p> <p>18 asbestos exposures that could arise from those activities,</p> <p>19 correct?</p> <p>20 A. Well, specifically from harvesting firewood,</p> <p>21 yes.</p> <p>22 Q. Okay. Can I get the 2009 -- do you also have</p> <p>23 the 2009 paper in front of you, sir?</p> <p>24 A. I don't.</p> <p>25 (Document marked Deposition</p>

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<p>1        Exhibit No. 5 for identification.)</p> <p>2 BY MR. STANSBURY:</p> <p>3        Q. I'm handing you what has been marked as</p> <p>4 Exhibit 5. Okay. I've handed you what has been marked as</p> <p>5 Exhibit 5, which is "Fate of Libby Amphibole Fibers When</p> <p>6 Burning Contaminated Firewood," by Tony Ward, Julie Hart,</p> <p>7 Terry Spear, Brienne Meyer, and James Webber, published in</p> <p>8 2009 in "Environmental Science Technology".</p> <p>9        Is that correct, sir?</p> <p>10      A. Yes.</p> <p>11      Q. Okay. And this article examined potential</p> <p>12 asbestos exposures that could occur when using wood as</p> <p>13 firewood in an indoor heating oven, correct?</p> <p>14      A. Yeah, I don't know if it evaluated exposures.</p> <p>15 We were mainly trying to determine if wood that was</p> <p>16 contaminated with the asbestos was burned, where would it</p> <p>17 end up, I mean where did it go.</p> <p>18      Q. Okay. So this was not aimed at looking at</p> <p>19 potential exposures.</p> <p>20      A. Well, not -- no, because we didn't really</p> <p>21 concentrate on doing an exposure measurement. It was</p> <p>22 mainly just sampling within the stove itself.</p> <p>23      Q. Okay. The 2007 paper, however, you are</p> <p>24 looking at, Exhibit 4, you are looking at potential</p> <p>25 exposures, correct?</p>		<p>1        Q. Was your concern that potentially people could</p> <p>2 be exposed to asbestos when burning firewood?</p> <p>3        A. I believe that would be fair, that there could</p> <p>4 be a potential concern.</p> <p>5        Q. Okay. And with Exhibit 4, the 2007 paper,</p> <p>6 there was a concern that there could be exposure to</p> <p>7 asbestos in the harvesting of firewood, correct?</p> <p>8        A. Yes.</p> <p>9        Q. Okay. Exposure in the ambient air, correct --</p> <p>10 well, strike that.</p> <p>11      This would be airborne exposures that arise from</p> <p>12 activities involved with harvesting firewood, correct?</p> <p>13      A. Yes.</p> <p>14      Q. Okay. And those could potentially cause</p> <p>15 disease, correct?</p> <p>16      A. I suppose that's correct, yes.</p> <p>17      Q. Right. That's your concern is preventing</p> <p>18 disease, correct?</p> <p>19      A. Yes.</p> <p>20      Q. And so with the 2006 paper, Exhibit 3; the</p> <p>21 2007 paper, Exhibit 4; the 2009 paper, Exhibit 5; when</p> <p>22 submitting these papers, you did not disclose to any of</p> <p>23 the publications that you were testifying as -- strike</p> <p>24 that.</p> <p>25      With respect to Exhibit 3, the 2006 paper; Exhibit</p>	
	79		81
<p>1        A. Yes.</p> <p>2        Q. Okay. Did you ever talk about this paper with</p> <p>3 Kris McLean?</p> <p>4        A. No.</p> <p>5        Q. Okay. Did you ever talk about the 2009 paper</p> <p>6 with Kris McLean?</p> <p>7        A. No.</p> <p>8        Q. But you did discuss Exhibit 3, which was the</p> <p>9 2006 paper, you discussed that with Kris McLean?</p> <p>10      A. No.</p> <p>11      Q. Oh, you never discussed any of these with Kris</p> <p>12 McLean?</p> <p>13      A. No. I basically would notify him of what we</p> <p>14 were trying to publish and that we were doing research up</p> <p>15 in Libby.</p> <p>16      Q. So you made him aware that you were doing this</p> <p>17 research, though, correct?</p> <p>18      A. Yes.</p> <p>19      Q. Okay. And the 2009 paper, you say it does not</p> <p>20 focus on potential exposures, correct?</p> <p>21      A. Well, not -- that wasn't the main aim of the</p> <p>22 study. It was to determine where are the fibers when you</p> <p>23 burn wood contaminated with the amphibole asbestos. Do</p> <p>24 they go out the stack? Do they go -- stay in the</p> <p>25 ductwork? Do they stay in the ash?</p>		<p>1        4, the 2007 paper; and 2009, the -- which is Exhibit 5,</p> <p>2 the 2009 paper, you did not disclose to the journals that</p> <p>3 you had been retained as an expert by the U.S. Government?</p> <p>4        A. I didn't.</p> <p>5        Q. Okay. Did you disclose to any of the journals</p> <p>6 that you had previously testified on behalf of Libby</p> <p>7 claimants?</p> <p>8        A. No.</p> <p>9        Q. Did you disclose to any of the journals about</p> <p>10 your retention in this matter here?</p> <p>11      A. I didn't. I wasn't -- well, no. I wasn't</p> <p>12 retained for this case until 2008 so -- (pause.)</p> <p>13      Q. But for the 2009 paper, Exhibit 5, this was</p> <p>14 published after you were retained, correct?</p> <p>15      A. Yes.</p> <p>16      Q. Okay. Why didn't you feel it was necessary to</p> <p>17 disclose that information to the journals?</p> <p>18      A. Well, because we are doing research to</p> <p>19 determine pathways of exposure. And it's not being paid</p> <p>20 for by any law firm, and I'm not doing it for a law firm.</p> <p>21 I'm doing it as a research exercise to try to determine</p> <p>22 pathways of exposure.</p> <p>23      Q. But this work is relevant to your opinions in</p> <p>24 this case, correct?</p> <p>25      A. I think all the work I've done in Libby before</p>	

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<p>1 these publications is relevant, yes.</p> <p>2 Q. Okay. So, for example, the 2007 paper, in</p> <p>3 your mind, this paper could be used to support an opinion</p> <p>4 that individuals in Libby could develop disease from</p> <p>5 harvesting lumber, correct?</p> <p>6 A. I suppose it could be.</p> <p>7 Q. Okay. "Yes" or "no," sir? Do you agree that</p> <p>8 that's true?</p> <p>9 A. Yes.</p> <p>10 Q. Okay. And presumably, this could be an</p> <p>11 individual who is a Libby claimant, correct? Are you</p> <p>12 aware of any Libby claimants who may have been exposed in</p> <p>13 the forest?</p> <p>14 A. I've never been involved with a court case</p> <p>15 that involved forestry or exposure to firewood, no.</p> <p>16 Q. Okay. Are you aware of any disease that's</p> <p>17 arisen from exposure to forestry or firewood?</p> <p>18 A. I'm not. I haven't seen any data on that.</p> <p>19 Q. Okay. So sitting here today, you have no</p> <p>20 opinion as to whether exposures in the woods at Libby</p> <p>21 could cause disease?</p> <p>22 A. Well, again, I'm not a doctor and I don't want</p> <p>23 to state an opinion as to if our research is saying that</p> <p>24 -- we don't say that in the research that it could cause a</p> <p>25 disease. We basically say that there could be exposures</p>		<p>1 amphibole, I'm not sure we know what level, lowest level</p> <p>2 was going to cause disease, then I guess any level would</p> <p>3 concern me.</p> <p>4 Q. Okay. And so this research, the 2007 paper,</p> <p>5 just so we're clear, who paid for that research?</p> <p>6 A. Which one again?</p> <p>7 Q. The 2007, Exhibit 4, the harvesting study.</p> <p>8 A. This was paid for through the University of</p> <p>9 Utah, I believe.</p> <p>10 Q. Okay.</p> <p>11 A. And it wasn't mine. It was Julie Hart's</p> <p>12 research. It was her grant.</p> <p>13 Q. Did you ever send a copy of this to Kris</p> <p>14 McLean?</p> <p>15 A. I don't remember if I did or not. I may very</p> <p>16 well have. I just wanted to keep him informed that we</p> <p>17 were doing the work up in Libby.</p> <p>18 Q. Okay. So you're doing the work in Libby,</p> <p>19 establishing these exposures. And then today, you're</p> <p>20 offering testimony about potential exposures that could be</p> <p>21 occurring in Libby that could cause disease, correct?</p> <p>22 A. Yes.</p> <p>23 Q. And a basis of that opinion is, in part, the</p> <p>24 studies, correct?</p> <p>25 A. Well, I rely on these studies, yes.</p>	
<p>1 and perhaps it would lead to a concern for disease.</p> <p>2 Q. Okay. Well, let's narrow this down a bit,</p> <p>3 because earlier we were talking, I'd asked you about</p> <p>4 whether you had opinions as to what exposure levels could</p> <p>5 cause disease. And you said that you did, correct?</p> <p>6 A. Yes.</p> <p>7 Q. Okay. And that was based in part on your</p> <p>8 review of epidemiological literature, correct?</p> <p>9 A. In part, yes.</p> <p>10 Q. As well as case reports, correct?</p> <p>11 A. Yes.</p> <p>12 Q. Okay. Do you have an opinion as to whether</p> <p>13 the exposures identified in Exhibit 4 can cause disease?</p> <p>14 A. And Exhibit 4 --</p> <p>15 Q. Yes.</p> <p>16 A. -- is the firewood harvesting?</p> <p>17 Q. Yes, sir.</p> <p>18 A. Yeah, I mean we wanted to determine if -- we</p> <p>19 knew the wood was contaminated, so we wanted to determine</p> <p>20 can we liberate fibers if we do this activity. So based</p> <p>21 on the personal breathing zone samples, we, you know, we</p> <p>22 found that fibers are liberated.</p> <p>23 Q. Okay. And were they liberated at a level that</p> <p>24 you believe could pose a threat to human health?</p> <p>25 A. Well, since -- particularly for Libby</p>	83		85

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<p style="text-align: right;">86</p> <p>1 the 2009 paper, you were retained in this case when that      2 paper was being considered for publication, correct?      3 A. Yes. It was being considered in 2008.      4 Q. Okay. And you at no point disclosed to the      5 journal that you were receiving compensation to offer      6 opinions about exposures in the same forest that were the      7 subject of that paper?      8 A. No.      9 Q. Okay. Did you review the guidelines for      10 disclosing conflicts of interest before submitting any of      11 those three papers?      12 A. Well, I didn't. I basically helped put the      13 papers together, and I think Tony Ward and Julie Hart      14 submitted them, so -- (pause.)      15 Q. Okay. Did you disclose to them that you had      16 been working for -- you had historically worked for      17 plaintiffs?      18 A. Yes. They know that I have been.      19 Q. Okay. And they knew that you were working for      20 the U.S. Government?      21 A. I don't know if they knew that or not. I      22 believe so.      23 Q. But they certainly knew that you were involved      24 with personal injury cases involving exposures in Libby,      25 correct?</p>	<p style="text-align: right;">88</p> <p>1 A. No.      2 Q. Okay. It's a pretty long report. Let's see      3 here, it's 27 pages; is that right?      4 A. I believe that's like 32 counting references.      5 Q. Okay, counting references, okay. And the      6 paragraphs are numbered, correct?      7 A. Yes.      8 Q. And some of these paragraphs deal with related      9 points and some of them deal with very different points,      10 correct?      11 A. That would be fair, I think.      12 Q. Okay. What I'd like to do is kind of walk      13 through the report so we can kind of identify which      14 paragraphs relate to specific opinions you intend to offer      15 at the hearing. And to the extent that we can kind of      16 group of the paragraphs together, perhaps we could do so.      17 Would you be willing to walk through that with me?      18 A. Sure.      19 Q. Okay. Now, Paragraph 1, your name and where      20 you live, I think we can move past that. And 2 and 3 are      21 background information. Paragraphs 4 and 5, these      22 paragraphs both relate to the published studies we were      23 just discussing, correct?      24 A. Yes.      25 Q. Paragraph 4 relates to Exhibit 3, whereas</p>
<p style="text-align: right;">87</p> <p>1 A. I believe they knew that.      2 Q. But there was no disclosure made?      3 A. Not that I know of.      4 Q. Okay. I would like to look -- do you have      5 your expert report with you today, sir?      6 A. Yes.      7 MR. STANSBURY: Could we mark that as an      8 exhibit, please.      9 MR. LEWIS: I've got one. What exhibit number      10 are you going to put on it?      11 (Document marked Deposition      12 Exhibit No. 6 for identification.)      13 MR. LEWIS: Maybe I'll take this other, the      14 other copy.      15 BY MR. STANSBURY:      16 Q. Before you is Exhibit 6. Is this your expert      17 report, sir?      18 A. Yes.      19 Q. Okay. And does this opinion reflect the      20 entirety of the opinions you intend to offer at the      21 confirmation hearing?      22 A. Yes.      23 Q. Okay. Has there been any work done since the      24 submission of this report that you believe informs the      25 opinions that you wish to offer in this case?</p>	<p style="text-align: right;">89</p> <p>1 Paragraph 5 relates to Exhibit 4. Correct, sir?      2 A. Yes.      3 Q. Okay. And there's no reference in this report      4 to Exhibit 5, the 2009 paper. That was published after      5 this report, correct?      6 A. Yes.      7 Q. But do you intend to offer any opinions at the      8 confirmation hearing based on that paper?      9 A. No.      10 Q. Okay. So we can just put that aside, then,      11 and not talk about it, correct?      12 A. Fine.      13 Q. Okay. Now, looking at Paragraph 6, Paragraph      14 6 and 7, these discuss - and if you don't like my      15 clarification, please tell me - these discuss the      16 historical conditions at the mining and milling facility,      17 correct, sir?      18 A. Well, yeah. It discusses, you know, the basic      19 flow of operations, flow of materials. And to that      20 extent, I think you're correct.      21 Q. Okay. Well, let's agree to a term that we can      22 both be comfortable with. Paragraph 6 and 7 both relate      23 to the historical operating conditions at Libby? Is      24 that --      25 A. Yes, again --</p>

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<p style="text-align: right;">90</p> <p>1 Q. Okay.      2 A. -- the way things were processed.      3 Q. Okay.      4 A. And what --      5 Q. So those were the historical conditions.      6 Paragraph 8, tell me if I read this correctly:      7 "The community of Libby lies in a mountain      8 valley. The valley air shed functions somewhat like a      9 bowl. Pollutants when disturbed by wind or human activity      10 tend to be recycled into the bowl."      11 Did I read that correctly, sir?      12 A. Yes.      13 Q. Okay. That opinion relates to the atmospheric      14 conditions in Libby, correct?      15 A. Yes.      16 Q. Okay. Outdoor, right?      17 A. Yes.      18 Q. Ambient air, is that another term for that as      19 well?      20 A. Yes, it could, I guess.      21 Q. Okay. Do industrial hygienists typically      22 study the ambient air?      23 A. Well, the industrial hygienist is primarily      24 concerned with what goes on inside the plant, but      25 certainly we do become involved with public exposure</p>	<p style="text-align: right;">92</p> <p>1 the atmosphere of other areas?      2 A. I haven't personally, no.      3 Q. Okay. Have you reviewed any literature which      4 has studied the Libby atmosphere in that manner?      5 THE WITNESS: As compared -- excuse me,      6 Counsel. I don't mean to interfere, but when you say "in      7 that manner," are you saying as compared to some other      8 place?      9 MR. STANSBURY: Yes.      10 MR. LEWIS: Okay.      11 THE WITNESS: Well, yes, I have looked at      12 literature describing that comparison.      13 Q. (By Mr. Stansbury) Can you name any of the      14 literature which --      15 A. Well, I -- let me -- I guess maybe I better      16 clarify. I mean I've looked at the literature that Tony      17 Ward has put together where he looks at source      18 apportionment; in other words, what's contributing to the      19 particulates in the air in Libby. Is it automobile      20 exhaust? Wood smoke? So from that standpoint, I've      21 looked at that type of literature.      22 Q. Is that a published paper?      23 A. I don't know if it's published or not.      24 Q. Okay.      25 A. I believe it is.</p>
<p style="text-align: right;">91</p> <p>1 because materials do move outside the plant. And so from      2 that standpoint, I wouldn't be quite that narrow.      3 Q. Okay. So when you say moving outside the      4 plant, do you mean, you know, a cloud of dust moving down      5 the street, or does that also involve atmospheric      6 conditions, you know, thousands of feet in all directions?      7 A. Well, probably not. I mean we certainly have      8 to record, you know, atmospheric conditions when we're      9 doing sampling. We want to know wind speeds and wind      10 directions and pressures, temperatures, and things like      11 that. So that's all atmospheric, I guess.      12 Q. Okay. And the statement, "The valley airshed      13 functions somewhat like a bowl," what is your basis for      14 that opinion?      15 A. Well, the basis for it is that there are a lot      16 of inversions in Libby, I mean if you've ever been up      17 there in the wintertime.      18 Q. Oh, I have.      19 A. And so it tends to have -- you know, the air      20 tends to settle within the valley.      21 Q. Okay.      22 A. That's all I meant there.      23 Q. Okay. Have you ever studied systematically      24 the extent to which any type of particulate or pollutant      25 would remain static in the Libby atmosphere compared to</p>	<p style="text-align: right;">93</p> <p>1 Q. But that's something that informs your opinion      2 as to whether the airshed functions somewhat like a bowl.      3 It was Tony Ward's work, correct?      4 A. Well, in part, yeah.      5 Q. In part. Did that work examine asbestos in      6 particular?      7 A. Not that I'm aware.      8 Q. Okay. It focused on, I think you mentioned,      9 automobile exhaust. Is that one of the potential      10 substances?      11 A. I believe so, wood smoke, and there were other      12 things that they looked at.      13 Q. Okay. But you've not looked at any literature      14 specific to how asbestos either remained or does not      15 remain in the atmosphere in Libby, have you?      16 A. Well, I've obviously looked at current studies      17 being done by EPA as the technical advisor to the TAG.      18 That's my job, is to, you know, evaluate what EPA is doing      19 up there and to try to find out if, you know, if there's      20 any problems with that. And so I do read their reports.      21 I've read their ambient air sampling reports and different      22 things.      23 Q. Okay. None of those reports, though, are      24 cited in this, in this expert report, though, right?      25 A. No.</p>

24 (Pages 90 to 93)

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<p style="text-align: right;">94</p> <p>1 Q. Okay. Nor is the Tony Ward article, correct?</p> <p>2 A. Correct.</p> <p>3 Q. Okay. And so when it says pollutants when</p> <p>4 disturbed by wind or human activity tend to be recycled in</p> <p>5 the bowl, that opinion is based also on Tony Ward's work</p> <p>6 as well as the EPA's work?</p> <p>7 A. Well, yes, in part, and just having been up</p> <p>8 there and just seeing how stagnant the air can be. So, I</p> <p>9 mean, that's the word "recycle." It's not going to move</p> <p>10 out of there very readily.</p> <p>11 Q. When you say just seeing the air, is that</p> <p>12 something that I would be just as capable of observing as</p> <p>13 you would, the stagnant air?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. That's not something that's based on an</p> <p>16 expertise that you have, correct?</p> <p>17 A. No.</p> <p>18 Q. Okay. Let's look at Paragraph 9, sir.</p> <p>19 Paragraph 9, and actually, I believe Paragraph 9, 10, and</p> <p>20 11, these paragraphs all seem to discuss ways in which</p> <p>21 people in the community may have been exposed to asbestos</p> <p>22 from the mining and milling facility; is that correct,</p> <p>23 sir?</p> <p>24 A. I believe that that would be correct in part,</p> <p>25 yes.</p>	<p style="text-align: right;">96</p> <p>1 asbestos in it, correct?</p> <p>2 A. Yes.</p> <p>3 Q. Okay. Let's turn to Paragraph 13. Now,</p> <p>4 Paragraph 13, you're talking about the industrial hygiene</p> <p>5 literature, correct?</p> <p>6 A. Yes.</p> <p>7 Q. And specifically, the literature is</p> <p>8 understanding of asbestos, correct?</p> <p>9 A. Yes.</p> <p>10 Q. And you also mention that, and if I say this</p> <p>11 correctly: "The above was clear in the occupational</p> <p>12 medicine and industrial hygiene literature, and W.R. Grace</p> <p>13 and its predecessor Zonolite Company should have been well</p> <p>14 aware of it."</p> <p>15 Correct?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. So this one, it's not necessarily just</p> <p>18 historical conditions. We're also kind of talking here</p> <p>19 about what W.R. Grace or Zonolite should have known at the</p> <p>20 time, correct?</p> <p>21 A. Yes.</p> <p>22 Q. And the way a company knows things, so to</p> <p>23 speak, is a function of its decision to gather</p> <p>24 information, correct?</p> <p>25 A. Yes.</p>
<p style="text-align: right;">95</p> <p>1 Q. Okay. So is it fair to say that these three</p> <p>2 paragraphs, 9, 10, and 11, they deal with potential</p> <p>3 community exposures?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. Paragraph 12: Various tests on the</p> <p>6 dust showed 27 to 40 percent asbestos. You cite to common</p> <p>7 exhibits, correct?</p> <p>8 A. Yes, common exhibits and, I mean, the</p> <p>9 percentages are also listed in, you know, publications</p> <p>10 like by EPA or ATSDR.</p> <p>11 Q. But these are historical measurements,</p> <p>12 correct? These weren't measurements that were done</p> <p>13 recently, correct?</p> <p>14 A. I believe they're historical.</p> <p>15 Q. Okay. And so they reflect the historical</p> <p>16 conditions that existed when the mine and the mill was</p> <p>17 operating, correct?</p> <p>18 A. Well, I'm not, I'm not sure how to answer your</p> <p>19 question. I mean the percentages, I don't know if they've</p> <p>20 changed. If they have, I don't know it.</p> <p>21 Q. Okay, okay.</p> <p>22 A. But, yeah, these do come from people looking</p> <p>23 historically at what's being reported.</p> <p>24 Q. Those were the conditions historically.</p> <p>25 Historically, 27 to 40 percent of the dust showed some</p>	<p style="text-align: right;">97</p> <p>1 Q. And that's an important part of being a</p> <p>2 responsible company in your mind, correct?</p> <p>3 A. Well, that's one way.</p> <p>4 Q. One way.</p> <p>5 A. Obviously, the other way is that someone gives</p> <p>6 them information --</p> <p>7 Q. Okay.</p> <p>8 A. -- and provides information to them.</p> <p>9 Q. But a company informing itself of potential</p> <p>10 hazards, that's part of a responsible company's code of</p> <p>11 conduct, correct?</p> <p>12 A. Please say that again.</p> <p>13 Q. Sure. A company informing themselves of</p> <p>14 potential hazards involving their enterprise, that is part</p> <p>15 of a responsible company's code of conduct, correct?</p> <p>16 MR. LEWIS: I'm going to object as -- I think</p> <p>17 the term "code of conduct" is vague. Without showing what</p> <p>18 you mean by that, I don't know how the witness can answer</p> <p>19 the question. I think the question is vague.</p> <p>20 Q. (By Mr. Stansbury) Do you understand my</p> <p>21 question, sir?</p> <p>22 A. No.</p> <p>23 Q. Okay. You believe that companies can act</p> <p>24 responsible?</p> <p>25 A. I hope that they do, yes.</p>

25 (Pages 94 to 97)

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<p style="text-align: right;">98</p> <p>1 Q. You believe companies can act irresponsibly, 2 don't you?</p> <p>3 A. Yes.</p> <p>4 Q. It's your opinion that Grace acted 5 irresponsibly for many years with respect to the mining 6 and milling operation in Libby, correct?</p> <p>7 A. Yes.</p> <p>8 Q. Do you consider that irresponsibility to be a 9 course of conduct that Grace took?</p> <p>10 A. I don't know what you mean by "course of 11 conduct."</p> <p>12 Q. Do you -- well, we can come to an agreement on 13 whatever words you want to use here. What I'm trying to 14 get across, though, is this opinion - and there's going to 15 be a lot of opinions in this report - really talks about 16 what Grace should have known, correct?</p> <p>17 A. Yes.</p> <p>18 Q. What they should have done, correct?</p> <p>19 A. Yes.</p> <p>20 Q. What they didn't do, correct?</p> <p>21 A. Yes.</p> <p>22 Q. Is there any way you would term -- is there 23 any term you would use to describe those issues? I'm open 24 to whatever term you want to use.</p> <p>25 A. Well, that's fine. We just mentioned them</p>	<p style="text-align: right;">100</p> <p>1 question, sir?</p> <p>2 A. Well, yes. And by informing themselves 3 meaning, you know, searching the literature for what's 4 known about a particular topic like asbestos, conducting 5 studies which are published and get the word out.</p> <p>6 Q. Right.</p> <p>7 A. Yeah, that's conduct.</p> <p>8 Q. Okay. So that's what Paragraph 13 --</p> <p>9 Paragraph 13, you know, addresses that. Paragraph 14, I'm 10 going to read this out loud (quoted as read):</p> <p>11 "The central principles of industrial hygiene 12 literature are to study, to warn and to protect. These 13 principles extend not only to Grace workers in Libby, but 14 also to family members of workers, and to the community. 15 W.R. Grace and its predecessor Zonolite Company did not 16 adequately study, warn or protect the workers, their 17 families, or the community of Libby."</p> <p>18 Did I read that correctly, sir?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. Again, this is an example where you 21 believe Grace's conduct was improper with respect to the 22 workers, the family members, and the community of Libby 23 correct, sir?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. Paragraph 15, this one's a little bit</p>
<p style="text-align: right;">99</p> <p>1 individually, so --</p> <p>2 Q. Okay. So, but they're actions, I mean these 3 are all actions or inactions by Grace, correct?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. And can we use the term "conduct"? I 6 mean is the term "conduct" comfortable to say that 7 somebody's conduct is responsible when they put in a 8 medical surveillance program? That's a form of conduct 9 that's responsible, correct?</p> <p>10 A. That would be fine.</p> <p>11 Q. Okay. And, you know, not making any effort to 12 keep a facility clean, that's irresponsible conduct, 13 correct?</p> <p>14 A. Yes.</p> <p>15 Q. And so I'm not trying to -- you know, I like 16 the word "conduct" because it's easy. I just want to make 17 sure we're on the same page here.</p> <p>18 Paragraph 13 talks about Grace's failure to -- or 19 states what they should have known. And one way a company 20 knows something is by informing itself, either somebody 21 telling them or, you know, taking affirmative steps to 22 learn, correct?</p> <p>23 MR. LEWIS: Objection; that's a compound 24 question and it's improper.</p> <p>25 Q. (By Mr. Stansbury) Do you understand the</p>	<p style="text-align: right;">101</p> <p>1 longer. But again, is it fair to say, and this is -- you 2 know, because you actually are quoting, I believe, Earl 3 Lovick's deposition testimony, correct, from the 4 Schnetter v. W.R. Grace transcript?</p> <p>5 MR. LEWIS: Objection; that's not correct.</p> <p>6 THE WITNESS: Well, are we on 15?</p> <p>7 MR. LEWIS: That's his trial testimony.</p> <p>8 MR. STANSBURY: Oh, excuse me. Thank you, 9 Tom, I appreciate that.</p> <p>10 Q. (By Mr. Stansbury) Paragraph 15 runs onto page 11 7 all the way to page 8, correct?</p> <p>12 A. Fifteen, yes.</p> <p>13 Q. Okay. And once again, here you are examining 14 what Grace knew about the conditions in Libby. And as you 15 state in the last sentence of the paragraph: "Grace 16 continues to send men into the dry mill for eight years 17 after 1966."</p> <p>18 Is that correct, sir?</p> <p>19 A. Yes.</p> <p>20 Q. So again, this speaks to Grace's, in your 21 mind, improper conduct during this time period, correct, 22 sir?</p> <p>23 A. Yes.</p> <p>24 Q. Okay. Moving on to Paragraph 16: "Grace knew 25 of the connection between asbestos exposure and lung</p>

26 (Pages 98 to 101)

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<p style="text-align: right;">102</p> <p>1 cancer through the 1964 State Report, and was therein 2 informed of 'possible widespread carcinogenic air 3 pollution" - citation to Exhibit 53 - "Risks of asbestos 4 to community members were quite clearly spelled out to 5 Grace executives in 1968," again citing Exhibit 119. 6 So here you believe that Grace was aware that there 7 were community risks, correct? 8 A. Yes. 9 Q. And Grace, in your mind, was not warning 10 people about these risks, correct? 11 A. That's correct. 12 Q. So again, not proper conduct for a company 13 like Grace, correct? 14 A. That's correct. 15 Q. Okay. Paragraph 17, this to me looks more 16 like discussions of the historical operations at Libby. 17 Is that a fair description of Paragraph 17? 18 A. Yes, the date 1967. 19 Q. Right. And you're talking about the test was 20 done in a large "600 fan" of the dry mill. So this 21 doesn't necessarily speak to their conduct, but again as 22 we were discussing earlier, speaks to what the conditions 23 were historically, correct, sir? 24 A. Well, it -- you know, if you read between the 25 lines, it speaks of their conduct, too, because it was</p>	<p style="text-align: right;">104</p> <p>1 the air in Libby," Exhibit 20, expert report of 2 Dr. Whitehouse. 3 Now, this paragraph speaks more to potential 4 community exposures, correct, sir? 5 A. Yes. 6 Q. Okay. Let's look at Paragraph 19. Again, I 7 believe this paragraph speaks to Grace's conduct at the 8 time, the last sentence being: "Accordingly, Grace's 9 medical surveillance program was inadequate at all times 10 up to 1990." 11 Do you agree, sir? 12 A. Yes. 13 Q. Okay. Paragraph 20, again, this is -- does 14 this deal with Grace's conduct? 15 A. Yes. 16 Q. Okay. Paragraph 21, same question: Does this 17 deal with Grace's conduct? 18 A. (Perusing document) -- yes. 19 Q. Paragraph 22, does this pertain to Grace's 20 conduct? 21 A. (Perusing document) -- yes. 22 Q. Paragraph 23, does this relate to Grace's 23 conduct? 24 A. (Perusing document) -- yes. 25 Q. Paragraph 24, does this relate to Grace's</p>
<p style="text-align: right;">103</p> <p>1 right in this time frame that the stack on the dry mill 2 was horizontally located, so -- (pause.) 3 Q. Okay. So, again, in your mind, this is part 4 of the conduct, then. You would put this under, again, 5 another example where Grace's conduct was improper. 6 A. Yes. 7 Q. Okay, that's fair. Paragraph 18, here you're 8 looking at - and I'm going to read this out, tell me if I 9 read this correctly: 10 "Residents have reported that Libby in 11 1950-1990 was a dusty place. The manager of Grace 12 operations estimated in 1965 that 'you could get a five 13 count in downtown Libby on many dry days.'" Exhibit 79. 14 This would have been 5 -- and could you please 15 explain what "mppcf" means so we're clear? 16 A. Million particles per cubic foot. 17 Q. -- "or about 20 fibers per cubic centimeter." 18 See Amandus (1987), citing Libby studies, expert report of 19 Dr. Alan C. Whitehouse. 20 "In 1975, Grace performed measurements of 21 ambient air at three locations in Libby and obtained 0.67, 22 1.1, and 1.5 f/cc" -- which is fibers per cubic 23 centimeter. Is that correct, sir? 24 A. Yes. 25 Q. -- "indicating a serious hazard from breathing</p>	<p style="text-align: right;">105</p> <p>1 conduct? 2 A. (Perusing document) -- well, it pertains to 3 their conduct and -- their conduct, and, you know, their 4 knowledge. 5 Q. Okay. And the knowledge that either informed 6 or perhaps did not inform the conduct they took, correct? 7 A. Yeah, their knowledge of what was going on 8 within their own plant. 9 Q. Right. And as you say, Grace settled the 10 case, correct? 11 A. Where do I say that at -- yes, okay. 12 Q. That's correct? 13 A. Yes. 14 Q. So that was the course of conduct they took 15 was to settle the case, correct? 16 A. Yes. In part, I believe that would be 17 correct. 18 Q. Okay. Paragraph 25, and I believe this 19 relates to a study of workers. And again, you state: 20 "This study was not disclosed." Is that correct? 21 A. Yes. 22 Q. And does that relate to Grace's conduct at the 23 time? 24 A. Yes, and state of the knowledge. 25 Q. And state of knowledge. Paragraph 26, this is</p>

27 (Pages 102 to 105)

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<p style="text-align: right;">106</p> <p>1 a study of hamsters which, as you state, was not 2 disclosed. Does this relate to Grace's conduct and 3 knowledge at the time?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. Paragraph 27, again, does this relate 6 to Grace's conduct?</p> <p>7 A. Yes.</p> <p>8 Q. I'd like to read Paragraph 27 for the record. 9 Tell me if I read this correctly, please.</p> <p>10 "In 1980 NIOSH proposed a study on Libby 11 workers. Grace's response was to consider alternatives, 12 including to 'obstruct and block' - "obstruct and block" 13 in quotes - "the study."</p> <p>14 Did I read that correctly, sir?</p> <p>15 A. Yes.</p> <p>16 Q. Now, ultimately, though, Grace cooperated with 17 NIOSH, didn't they?</p> <p>18 A. Yes.</p> <p>19 Q. And that study --</p> <p>20 A. Well, eventually NIOSH came into the plan, 21 sure.</p> <p>22 Q. Right. However eventually, this proposed 23 study became the Amandus study, correct?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. But you don't mention that below, do</p>	<p style="text-align: right;">108</p> <p>1 A. (Perusing document) -- yes.</p> <p>2 Q. Now, Paragraph 33, this discusses the -- how 3 would you characterize Paragraph 33?</p> <p>4 A. Let me read it. May I?</p> <p>5 Q. Please do.</p> <p>6 A. (Perusing document) -- it certainly pertains 7 to their knowledge.</p> <p>8 Q. Ultimately -- okay, so it pertains to their 9 knowledge. So you would say -- or is it fair to say this 10 provides just background on the natural conditions in the 11 Libby area?</p> <p>12 A. Well, it pertains to their conduct, too --</p> <p>13 Q. Okay.</p> <p>14 A. -- because they're actually trying to market 15 this stuff.</p> <p>16 Q. Fair, okay. And Paragraph 34, I'll read this 17 for the record (quoted as read):</p> <p>18 "Grace knowingly endangered the health of 19 workers, family members of workers and community members 20 in Libby for decades. This constituted gross violations 21 of applicable industrial hygiene standards."</p> <p>22 Did I read that correctly, sir?</p> <p>23 A. Yes.</p> <p>24 Q. And that, of course, relates to their conduct, 25 does it not?</p>
<p style="text-align: right;">107</p> <p>1 you?</p> <p>2 A. No.</p> <p>3 Q. Okay. Paragraph 28, again, does this relate 4 to Grace's conduct, historical conduct?</p> <p>5 A. (Perusing document) -- yes.</p> <p>6 Q. Okay. Paragraph 28 -- excuse me, Paragraph 7 29, does this relate to Grace's historical conduct?</p> <p>8 A. (Perusing document) -- it relates to their 9 conduct, yes.</p> <p>10 Q. Okay. Paragraph 30, does this relate to 11 Grace's historical conduct?</p> <p>12 A. (Perusing document) -- yes. And in addition 13 to relating to their conduct, it relates to, you know, 14 what is done in the field of industrial hygiene, so just 15 so we're clear on that.</p> <p>16 Q. Okay. No, that's fair. But what is done in 17 the field of industrial hygiene is, particularly at that 18 time, is certainly a relevant consideration when 19 evaluating their conduct, correct, sir?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. Paragraph 31, once again, does this 22 relate to Grace's historical conduct?</p> <p>23 A. (Perusing document) -- yes.</p> <p>24 Q. Okay. Paragraph 32, does this relate to 25 Grace's historical conduct?</p>	<p style="text-align: right;">109</p> <p>1 A. Yes.</p> <p>2 Q. The term "knowingly endangered," is that a 3 term that's often used in industrial hygiene?</p> <p>4 A. Well, "knowingly" -- I mean they endangered 5 and they knew what was in this material, so they knowingly 6 endangered these people.</p> <p>7 Q. Is that an opinion that you shared with Kris 8 McLean, that they had knowingly endangered these people?</p> <p>9 A. I don't know if it was or not.</p> <p>10 Q. Okay. Okay, Paragraph 35, is it fair to say 11 that this paragraph speaks generally about the history of 12 the medical community's understanding of asbestos disease?</p> <p>13 A. Yes.</p> <p>14 Q. This is in no way specific to Grace, correct?</p> <p>15 A. It speaks to the historical knowledge of.</p> <p>16 Q. So arguably, this could be something which 17 could be used to evaluate their conduct because of what 18 they could have historically known, correct?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. Paragraph 36, this paragraph speaks to 21 the, I would say, mineralogical content of the Libby 22 amphibole; is that correct?</p> <p>23 A. Yes, and also knowledge about the toxicity of 24 at least part of that amphibole.</p> <p>25 Q. "The Montana Supreme Court has found asbestos</p>

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<p>110</p> <p>1 dust was a well known toxic inhalant prior to 1956." Is 2 that the portion that you say speaks to toxicity?</p> <p>3 A. Which paragraph are you on again?</p> <p>4 Q. Sure, 36, I'm reading in the middle of the 5 paragraph.</p> <p>6 A. Oh, okay. Yeah, and the reference to Vorwald.</p> <p>7 Q. What is Vorwald?</p> <p>8 A. Vorwald essentially performed some 9 toxicological studies on tremolite.</p> <p>10 Q. However, our understanding of the toxicity of 11 tremolite today is more informed by studies performed by 12 individuals such as Amandus, McDonald, Sullivan, or 13 Lockey, correct?</p> <p>14 A. Well, considering the fact that we are looking 15 at the different forms of amphibole in there, yes.</p> <p>16 Q. Okay. So this paragraph speaks more to 17 historical understanding, correct, as opposed to current 18 understanding?</p> <p>19 MR. LEWIS: Objection, because if you read the 20 rest of the paragraph, obviously, it talks about current 21 understanding as I see it. So I think that misstates what 22 the --</p> <p>23 MR. STANSBURY: Provided we're limiting this 24 to toxicity. On the issue of toxicity, I see the Meeker 25 study --</p>	<p>112</p> <p>1 the record: "More recently, sophisticated analysis has 2 shown that Libby asbestos is 84% winchite, 11% richterite, 3 and 6% tremolite."</p> <p>4 Did I read that correctly, sir?</p> <p>5 A. Yes.</p> <p>6 Q. Okay. And as you stated, you're not a 7 mineralogist, correct.</p> <p>8 A. No.</p> <p>9 Q. You're not a toxicologist, correct?</p> <p>10 A. Correct.</p> <p>11 Q. You don't have any opinions that go beyond 12 what is available in the public literature with respect to 13 the toxicology or mineralogy of the Libby fibers, correct?</p> <p>14 A. Correct.</p> <p>15 Q. Okay. Paragraph 37, once again, this 16 paragraph, similar to the ones before it, discusses the 17 historical understanding by the medical community of 18 potential health risks caused by asbestos, correct?</p> <p>19 A. Well, the health risks -- I'll read that 20 again. (Perusing document) -- yes.</p> <p>21 Q. Okay. And similarly, Paragraph 38 also refers 22 to historical knowledge of the health effects from 23 exposure to asbestos, correct?</p> <p>24 A. Yes.</p> <p>25 Q. And Paragraph 39 also refers to the historical</p>
<p>111</p> <p>1 MR. LEWIS: Why don't you restate your 2 question --</p> <p>3 MR. STANSBURY: Yeah, maybe --</p> <p>4 MR. LEWIS: -- and I won't object if that's 5 what you're limiting it to.</p> <p>6 MR. STANSBURY: Right, that's what I'm 7 limiting it to.</p> <p>8 Q. (By Mr. Stansbury) This, the discussion of 9 toxicity in this paragraph speaks to when the medical 10 community first became aware that tremolite was toxic but 11 is not necessarily the authoritative source today for 12 determining the toxicity of these fibers, correct?</p> <p>13 MR. LEWIS: Of asbestos -- of Libby fibers?</p> <p>14 MR. STANSBURY: Of Libby fibers.</p> <p>15 MR. LEWIS: Okay. No objection.</p> <p>16 THE WITNESS: Well, yeah, the reference to 17 Vorwald talks about the toxicity as evaluated through tox 18 studies in his lab in 1951. But that, by no means, was 19 the only discussion of the hazards of --</p> <p>20 Q. (By Mr. Stansbury) Right.</p> <p>21 A. -- or the toxicity of tremolite prior to that.</p> <p>22 Q. Okay. And then you also cite to Meeker in 23 this paragraph, correct?</p> <p>24 A. Yes.</p> <p>25 Q. And for the purpose of -- I'll read this for</p>	<p>113</p> <p>1 understanding of health effects associated with exposure 2 to asbestos, correct?</p> <p>3 A. Yes.</p> <p>4 Q. And Paragraph 40 also refers to the historical 5 understanding of medical literature with the caveat here 6 that you mentioned industrial hygienists often review this 7 literature, correct?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. If I could read Paragraph 40 for the 10 record:</p> <p>11 "By the 1960s, hundreds of articles and 12 studies published in the industrial hygiene and medical 13 literature established that asbestos exposure is harmful 14 and can be fatal. These materials were readily available 15 to anyone interested in learning about the dangers of 16 asbestos. As a standard practice, industrial hygienists 17 review industrial hygiene literature, as well as 18 occupational medicine literature."</p> <p>19 Did I read that correctly, sir?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. So once again, we're speaking about the 22 state as of the 1960s, correct?</p> <p>23 A. Yes.</p> <p>24 Q. Okay. Paragraph 41, this paragraph speaks 25 about historical conditions but specifically discusses</p>

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<p style="text-align: right;">114</p> <p>1 potential community exposures arising out of the 2 historical conditions, correct, sir?</p> <p>3 A. Yes. It's speaking to the, you know, the 4 aerodynamic properties of asbestos and how it can expose 5 people who are not directly working with the material.</p> <p>6 Q. In Paragraph 42 --</p> <p>7 A. It also speaks -- if I may interrupt for just 8 a second --</p> <p>9 Q. Sure.</p> <p>10 A. -- it also speaks to control.</p> <p>11 Q. Historical control?</p> <p>12 A. Well, it's -- the same controls we use now are 13 what was used historically, so -- (pause.)</p> <p>14 Q. Okay. But obviously because we're talking 15 about Libby, we're talking about historical operation 16 because it hasn't been operation for, I guess, 18 - 19 17 years, correct?</p> <p>18 A. That's fine.</p> <p>19 Q. Okay. In Paragraph 42, I'm going to read the 20 first sentence: "Asbestos fibers in the air are known to 21 travel long distances from their source or point of 22 origin."</p> <p>23 Did I read that correctly, sir?</p> <p>24 A. Yes.</p> <p>25 Q. And then you cite to the Environmental</p>	<p style="text-align: right;">116</p> <p>1 Q. Has our understanding of how asbestos fibers 2 behaved in the air changed in any way in the last 31 3 years?</p> <p>4 A. Very little if at all.</p> <p>5 Q. Okay, okay. So again, this paragraph would 6 speak to, you know, ultimately would speak to the 7 potential for exposure in the community, correct?</p> <p>8 A. Yes, bystander exposure, I think.</p> <p>9 Q. Okay, okay. Paragraph 43, does that similarly 10 speak to the potential exposure of a bystander?</p> <p>11 A. Yes.</p> <p>12 Q. Okay.</p> <p>13 MR. LEWIS: Counsel, I'm not trying to be 14 difficult here, but "bystander" has legal connotations as 15 well, like a bystander liability, and I'm a little 16 concerned about that. So I don't want to interrupt your 17 examination. I think I understand what you mean by 18 "bystander", but if you don't, on my examination, I'll ask 19 the witness his understanding of bystander.</p> <p>20 If you could clear that up now, I think that 21 might be helpful.</p> <p>22 MR. STANSBURY: Okay.</p> <p>23 MR. LEWIS: It's up to you.</p> <p>24 Q. (By Mr. Stansbury) I'm getting "bystander 25 exposure" from your report. That's in Paragraph 43; is it</p>
<p style="text-align: right;">115</p> <p>1 Protection Agency, and you say as follows, which states as 2 follows:</p> <p>3 "During the time that the asbestos fiber 4 remains airborne, it is able to move laterally with air 5 currents and contaminate spaces distant from the point of 6 release. Significant levels of contamination have been 7 documented hundreds of meters from a point source of 8 asbestos fibers, and fibers also move across contamination 9 barrier symptoms with the passage of workers during 10 removal of material.</p> <p>11 "The theoretical times needed for such 12 respirable fibers to settle from a 3 meter ceiling are 4, 13 20 and 80 hours in still air. Turbulence will prolong the 14 settling and also cause reentrainment of fallen fibers,' 15 (Sprayed Asbestos Containing Materials in Buildings, A 16 Guidance Document, U.S. Environmental Protection Agency, 17 March 1978)."</p> <p>18 Did I read that correctly, sir?</p> <p>19 A. Yes.</p> <p>20 Q. So this is a cite to an EPA source a little 21 over 30 years ago, correct?</p> <p>22 A. In 1978, yes.</p> <p>23 Q. Discussing how asbestos fibers travel, 24 correct?</p> <p>25 A. Yes.</p>	<p style="text-align: right;">117</p> <p>1 not?</p> <p>2 A. Correct.</p> <p>3 Q. And what do you mean by "bystander exposure"?</p> <p>4 A. "Bystander" would mean, again, someone who is 5 not working directly with the material, but they're doing 6 something else at distances away from that job.</p> <p>7 Q. Right.</p> <p>8 A. So that's what I mean by "bystander."</p> <p>9 Q. Okay.</p> <p>10 A. It's kind of a loose term, I guess.</p> <p>11 Q. Sure.</p> <p>12 MR. LEWIS: Thank you, Counsel, for allowing 13 that clarification.</p> <p>14 Q. (By Mr. Stansbury) Paragraph 44, I think this 15 paragraph relates to general principles of industrial 16 hygiene, correct?</p> <p>17 A. Yes.</p> <p>18 Q. It's not specific to Libby in any way, is it 19 not?</p> <p>20 A. It's general industrial hygiene principles.</p> <p>21 Q. Okay. Paragraph 45, does this relate to the 22 historical conditions and operations of the Libby 23 vermiculite mine?</p> <p>24 A. (Perusing document) -- in part, yes.</p> <p>25 Q. What else does it relate to?</p>

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<p style="text-align: right;">118</p> <p>1       A. Yeah, it relates to percentages, basically, in 2 the materials, so it would be historical. 3       Q. Okay. And Paragraph 46, reading the first 4 sentence, "Soil containing Libby asbestos at levels equal 5 to or greater than 1% are generally considered a health 6 hazard requiring remediation," did I read that correctly, 7 sir?</p> <p>8       A. Yes.</p> <p>9       Q. What is your basis for that sentence?</p> <p>10      A. My basis for that sentence is published 11 studies from EPA, Atkinson's, I think, study. I think 12 they might be listed in here.</p> <p>13      Q. Is it --</p> <p>14      A. NIOSH; there's a series of articles that 15 discuss this 1 percent issue, if that's what we want 16 to --</p> <p>17      Q. Is it a federally mandated action level? Is 18 that your understanding?</p> <p>19      A. And we're talking about the 1 percent?</p> <p>20      Q. Yes, yes.</p> <p>21      A. The 1 percent is a, is a percentage which 22 would be considered asbestos containing for removal, I 23 guess would be the best way to describe it.</p> <p>24      Q. Okay. As an industrial hygienist, is it 25 common for you to examine the asbestos content of soil?</p>	<p style="text-align: right;">120</p> <p>1       Libby; Atkinson's; NIOSH considers it to be a friable 2 material where if not bound up in anything, it's going to 3 be released from the material that it's contained in. The 4 fibers are all loose.</p> <p>5       Q. You say: "A review of the literature." Prior 6 to working with Libby, had you ever studied the propensity 7 of asbestos to be released from soil?</p> <p>8       A. No.</p> <p>9       Q. Okay. Had you ever studied releases of any 10 hazard from soil?</p> <p>11      A. From soil, no.</p> <p>12      Q. Okay. So soil analysis was not something that 13 you had previously done until you got involved with Libby. 14 correct?</p> <p>15      A. That would be fair.</p> <p>16      Q. In your 20 -- how many years have you been an 17 industrial hygienist?</p> <p>18      A. I don't know; 30.</p> <p>19      Q. Thirty years, okay. So dealing with soil was 20 not something that you had dealt with previously.</p> <p>21      A. Well, you know, I hate to be limited. I mean 22 I've been involved with looking at asbestos levels in 23 dust, in other words. I don't know if you want to call 24 that "soil," but soil -- I'm trying to think if I've done 25 soil work previous to the Libby work, and I can't remember</p>
<p style="text-align: right;">119</p> <p>1       A. Well, we have -- or I have. It could be one 2 of our tasks, yes.</p> <p>3       Q. Do you have any training studying the 4 propensity of asbestos fibers to be released from soil?</p> <p>5       A. Well, we've -- again, the literature tells us 6 how it could be released from soils. In terms of my 7 personal experience, yeah, we've collected soil samples 8 for asbestos and -- (pause.)</p> <p>9       Q. So you did examination of - and maybe I'm 10 using this term incorrectly - "bulk material," correct?</p> <p>11      A. Yes.</p> <p>12      Q. Okay. That's distinct, though, from doing 13 airborne measurements, correct?</p> <p>14      A. Yes.</p> <p>15      Q. Okay. Do you have an opinion as to the 16 propensity of asbestos in soil to be released into the 17 ambient air?</p> <p>18      A. Yes.</p> <p>19      Q. What is your opinion?</p> <p>20      A. My opinion is that amphibole asbestos from 21 Libby can be released into the air if it is contained in 22 low, very low percentages within the soil; very clear.</p> <p>23      Q. Okay. And what is your basis for that 24 opinion?</p> <p>25      A. Again, studies that have been done by EPA in</p>	<p style="text-align: right;">121</p> <p>1 if I'm looking at dust levels or levels that are contained 2 in the dust on a surface, or something like that.</p> <p>3       Q. For example, settled dust that has settled on 4 a surface of part of an industrial facility? Is that what 5 you're talking about?</p> <p>6       A. Yes.</p> <p>7       Q. Okay.</p> <p>8       A. Or a home or something like that.</p> <p>9       Q. Right. But that is distinct from soil, is it 10 not?</p> <p>11      A. Yes.</p> <p>12      Q. Okay. And the tendency of an asbestos fiber 13 to be released from a flat surface is certainly different 14 than a tendency of an asbestos fiber to be released from 15 soil, correct?</p> <p>16      A. Well, it could be. I think it's all related 17 to activity.</p> <p>18      Q. Okay. What activities have you personally 19 done to determine the tendency of asbestos to be released 20 from soil?</p> <p>21      A. Well, what activities have I done -- I mean 22 we're currently involved with a research project where 23 we're analyzing surface dust in homes that contain 24 vermiculite attic insulation. We are taking air samples 25 at the same time. So we're trying to establish if there</p>

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<p style="text-align: right;">122</p> <p>1 is a risk from surface contamination as to an airborne 2 exposure. So that's the work I've done. 3 Q. But that's not soil. That is asbestos within 4 a home. That's not asbestos that is in the soil on the 5 ground, correct? 6 A. Right, it's in a house or -- 7 Q. Okay. And that's what industrial hygienists 8 tend to look at is soil within -- excuse me. Strike that. 9 Industrial hygienists tend to examine asbestos 10 within a facility or on a settled surface, correct? 11 A. Well, no, I wouldn't say that. I mean you 12 could have an industrial facility where they're doing a 13 removal job like asbestos siding. And obviously, the soil 14 is contaminated from that siding, so we would look at 15 soil. And we've done that up at Montana Tech. 16 Q. Okay. But the question I had asked earlier, 17 which elicited the response regarding the work you've done 18 in homes, was what work you have done studying the release 19 of asbestos from soil in Libby. 20 A. Well, again, it would be the same sort of 21 situation where -- an industrial hygienist would be 22 concerned about a release into any media, whether it be 23 soil or dust, and we certainly take air samples in 24 conjunction with that. So whether or not we can establish 25 a relationship between what's in the soil or the media and</p>	<p style="text-align: right;">124</p> <p>1 accurately. And that's the problem here. If you're going 2 to load up your questions by your own paraphrase of his 3 testimony and -- that's deceptive questioning and that's 4 what I object to here. 5 MR. STANSBURY: Okay. Let's get back to -- 6 let's refocus on that for a moment. 7 Could you read the last pending question, 8 please. 9 (The record was read by the court reporter as 10 follows: 11 "QUESTION: So sitting here today, you're not 12 aware of any reliable source that would allow us to 13 determine the potential airborne releases from asbestos in 14 soil?" 15 THE WITNESS: Well, I'm aware of studies that 16 have been done and are being done by the EPA in Libby 17 where they are evaluating release of asbestos fibers from 18 soil. 19 BY MR. STANSBURY: 20 Q. Okay. Other than those studies, anything 21 else? 22 A. Not that I can think of right now. 23 Q. Okay. So let's talk about those studies, 24 then. Are these studies that are ongoing now? 25 A. Well, they're doing activity-based sampling in</p>
<p style="text-align: right;">123</p> <p>1 the air is another question, but we certainly look at 2 those aspects. 3 Q. I understand looking at the aspect, but 4 sitting here today, have you derived a relationship from 5 your work that compares the amount of asbestos in soil 6 with the amount of asbestos that's released into the air 7 when the soil is disrupted? 8 A. Well, no, that's work that's ongoing right now 9 in Libby. No one had that relationship right now. 10 Q. So sitting in here, sitting here today, you're 11 not aware of any reliable source that would allow us to 12 determine the potential airborne releases from asbestos in 13 soil? 14 MR. LEWIS: I'm going to object to the form of 15 the question because I think that assumes -- misstates the 16 witness evidence in the sense that he was talking about 17 quantification as to whether or not there were such 18 releases, but -- so I think the question assumes facts not 19 in evidence. 20 MR. STANSBURY: I think you could say "assumes 21 facts not in evidence" without coaching the witness. I 22 would appreciate doing so next time. 23 You may answer. 24 MR. LEWIS: Well, I would appreciate, Counsel, 25 that when you restate his testimony, you restate it</p>	<p style="text-align: right;">125</p> <p>1 Libby right now, in Libby and up at the mine. 2 Q. Um-hmm. 3 A. Paul Peronard did the initial studies in the 4 early '90s in Libby where they did activity-based sampling 5 to try to determine what is coming off gardening, 6 driveways, working with soils as well as other types of 7 media, sure. 8 Q. Okay. Did you rely upon those results in 9 formulating your opinions regarding the hazards from 10 asbestos in soil in Libby? 11 A. Yes. This 1 percent issue, yes, I've relied 12 on that. 13 Q. Specifically, you relied upon the studies done 14 by EPA, correct? 15 A. Yeah, I relied on the knowledge I have accrued 16 in reading EPA documents both before I became a technical 17 advisor for the TAG and after. 18 Q. Okay. And which -- by "EPA documents," we're 19 talking about post 1999 EPA documents, correct, the ones 20 that deal with the studies that you're referencing? 21 Those all began when Paul Peronard came to Libby in 22 November of '99, correct? 23 A. Yes. 24 Q. Okay. So with respect to those post 1999 EPA 25 studies, which ones have been published?</p>

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<p>126</p> <p>1 A. Well, they're published by EPA, I guess. I 2 don't know how to answer your question. I'm trying to 3 look -- yeah, like they're referencing the Christopher 4 Weis memorandum is referenced in Paragraph 48, so those 5 are the types of things I'm referring to.</p> <p>6 Q. The Christopher Weis memorandum, so we're 7 clear, the one in Paragraph 48 that relates to -- now I'm 8 going to read the statement that you have citing that and 9 let me know if I read it correctly:</p> <p>10 "These results clearly indicate that 11 vermiculite insulation in homes or commercial buildings is 12 a substantial reservoir of asbestos-contaminated source 13 material that may lead to ongoing exposure of area 14 residents and workers."</p> <p>15 Did I read that correctly, sir?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. So he's talking about, again, asbestos 18 in homes and in commercial buildings, correct?</p> <p>19 A. Yes, as part of the work that was done up 20 there by Peronard and others, looking at exposure levels 21 that are coming from soil and different sort of things 22 based on activities that are being done.</p> <p>23 Q. Okay. But that citation here that you list, 24 this is not speaking about soils specifically, is it not?</p> <p>25 A. If you read the citation, I think you will</p>	<p>128</p> <p>1 Q. Right. 2 A. -- number, but -- (pause.) 3 Q. Were these memoranda cited in your report? 4 A. I don't know if they're cited in my report or 5 not. They may not be.</p> <p>6 Q. Okay. Sitting here today, were these 7 memoranda included among your reliance materials?</p> <p>8 A. Yes. Well, I mean, it's like I say, I'm 9 trying to include --</p> <p>10 Q. Well, did you produce copies? Are you aware 11 of whether copies of these memoranda were produced to us?</p> <p>12 A. I'm not aware of that.</p> <p>13 Q. Okay.</p> <p>14 A. You were asking me about my knowledge of soil 15 and release of asbestos from the soil.</p> <p>16 Q. Understood. So clearly, you clearly relied on 17 these memoranda in reaching this opinion, correct?</p> <p>18 A. I've relied on all of the documents that I've 19 read over the years pertaining to potential of release 20 from soils into the air.</p> <p>21 Q. Okay. And so far we've listed the Chris Weis 22 memoranda; the EPA studies that look at indoor air that, I 23 believe you said, inferred that the indoor air was a 24 result of asbestos being blown in from the soil. Is that 25 correct?</p>
<p>127</p> <p>1 find that it's talking about soil, but -- if you read the 2 paper.</p> <p>3 Q. Okay. So is it fair to say, then, that one 4 item we have identified that informs your opinion about 5 the potential release of asbestos from soil is the Chris 6 Weis action memorandum?</p> <p>7 A. Yes.</p> <p>8 Q. Okay. Anything else?</p> <p>9 A. Well, there's been more recent publications by 10 EPA in the later time period where they are -- where 11 they've collected indoor air samples at a given period in 12 time, and then they've gone back and collected indoor air 13 samples later on. And they are attributing in their 14 documents to this increase in indoor air asbestos at a 15 later date due to the soil, the soil contamination. So 16 that informs my opinion.</p> <p>17 Q. How would indoor air be related to releases 18 from soil?</p> <p>19 A. Because it blows into the house. I'm not 20 talking, you know, anything too complicated here.</p> <p>21 Q. Okay. So -- and when was this study 22 conducted?</p> <p>23 A. Well, I think there's been some done in the 24 early, well, probably 2005 - 2006. There are technical 25 memorandums. I can't quote them by --</p>	<p>129</p> <p>1 A. I believe that's what they concluded.</p> <p>2 Q. Okay. Are there any other sources that inform 3 your opinion as to the propensity of asbestos be released 4 from soil?</p> <p>5 A. Well, again, there's other citations: EPA 6 2001, EPA 2004.</p> <p>7 Q. I'm sorry, which page are we on?</p> <p>8 A. I was looking under Paragraph 46.</p> <p>9 Q. The ones that speak to the --</p> <p>10 A. It begins with soil containing Libby asbestos.</p> <p>11 Q. Sitting here today, are you aware of a 12 correlation between asbestos and soil and the amount of 13 asbestos that can be released into the air?</p> <p>14 A. Well, that's a question mark.</p> <p>15 Q. Okay. So that's certainly something you 16 cannot say reliably that "X" level of asbestos in the soil 17 will produce "Y" level of asbestos in the air, correct?</p> <p>18 A. That would be correct.</p> <p>19 Q. Okay.</p> <p>20 MR. LEWIS: Is it a good time for a break?</p> <p>21 MR. STANSBURY: Yeah, let's take a break.</p> <p>22 That's fine.</p> <p>23 VIDEOPHOTOGRAPHER: The time is 11:08. We're off 24 of the record.</p> <p>25 (The lunch recess was taken.)</p>

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<p>1        VIDEOGRAPHER: This is Tape 3 of the      2 videotaped deposition of Dr. Terry Spear.      3        The time is 11:47. We're on the record.      4 BY MR. STANSBURY:      5        Q. Okay. Dr. Spear, can we move to Paragraph 52,      6 please. And in 52 and 53, there are statements here      7 regarding the toxicity of asbestos from Libby; is that      8 correct, sir?      9        A. Yes.      10      Q. And once again, you are not a toxicologist,      11 correct?      12      A. That's correct.      13      Q. You don't intend to offer any specific      14 opinions about toxicity at the confirmation hearing, do      15 you?      16      A. I cannot offer any opinions on toxicology, no.      17      Q. Okay. Dr. Spear, have you reviewed the      18 Amandus paper, 1987?      19      A. I have at one point in time, yes.      20      Q. Okay. Who is Harlan Amandus?      21      A. I'm sorry, who is he?      22      Q. Yeah. Do you know who he is?      23      A. No.      24      Q. Okay. You've never met him before?      25      A. I've never met him.</p>	130	<p>1        correct?      2        A. That's correct.      3        Q. Because in order to determine something like      4 toxicity, you need to know information about exposure,      5 correct?      6        A. Yes.      7        Q. Okay. And this is clearly the paper of the      8 three most relevant to your area of expertise, is it not?      9        A. I'm sorry, by "three" --      10      Q. You're aware that there was a mortality study      11 and a morbidity study also done by Amandus, correct?      12      A. Yes.      13      Q. Okay. And so the papers that look at, those      14 papers, the morbidity study, are you familiar with that?      15      A. Yes.      16      Q. Okay. That looked at radiographic      17 abnormalities in the working population and correlated      18 that to exposures, correct?      19      A. Yes.      20      Q. The mortality study looked at mortality within      21 a worker cohort and correlated that with exposure,      22 correct?      23      A. Yes.      24      Q. Both papers were dependent upon the exposure      25 data contained in this paper, correct?</p>	132
<p>1        Q. You are aware that he was working at NIOSH at      2 the time he wrote that paper, correct?      3        A. Yes.      4        Q. NIOSH is the National Institute of      5 Occupational Safety and Health; is that correct?      6        A. Yes.      7        Q. And that is part of the United States      8 Government, is it not?      9        A. Yes.      10      (Document marked Deposition      11 Exhibit No. 7 for identification.)      12 BY MR. STANSBURY:      13      Q. Okay. I'm handing you what's been marked as      14 Exhibit 7. Exhibit 7 is "The Morbidity and Mortality of      15 Vermiculite Miners and Millers Exposed to Tremolite: Part      16 I. Exposure Estimates"; authors: Amandus, Wheeler,      17 Jankovic, and Tucker; published in 1987 in the American      18 Journal of Industrial Medicine.      19      Did I read that correctly, sir?      20      A. Yes.      21      Q. Okay. And do you -- is this familiar with      22 you? Do you recognize this document?      23      A. Yes.      24      Q. Okay. This is the paper by Amandus that      25 specifically focuses on establishing the exposures,</p>	131	<p>1        A. That's correct.      2        Q. And of the three papers, this is the paper      3 that primary falls within your area of expertise, correct?      4        A. Well, in terms of exposure measurement, yes.      5        Q. Yes, okay. And do you have any general      6 opinions regarding this paper?      7        A. Well, I've read this paper, you know,      8 associated with other W.R. Grace cases, and my general      9 opinion pertaining to any exposure measurements at the      10 mine site, or it may be if it was done outside the mine      11 site in Libby, is that during this time frame, they were      12 basically looking at PCM analysis. And in my opinion, the      13 fibers that were less than 5 micrometers in length are not      14 being factored into the exposure.      15      Q. Five micrometers or five microns?      16      A. The same thing: Microns/micrometers.      17      Q. Micrometers is the same -- okay, got it.      18      So you believe that this paper should have looked at      19 fibers with -- that were less than 5 microns in length,      20 correct?      21      A. Yeah. As an industrial hygienist, my opinion      22 is that the -- that fibers shorter than 5 micrometers can      23 be toxic, but we don't know that they're not toxic. And      24 I'm uncomfortable with not considering that in either risk      25 assessment, or evaluation, or what have you.</p>	133

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<p style="text-align: right;">134</p> <p>1 Q. Are you aware of other epidemiological studies 2 that only counted fibers longer than 5 microns in length? 3 A. That's been the standard practice. 4 Q. Okay. So this paper is in no way an outlier, 5 so to speak, insofar as they only counted fibers longer 6 than 5 micrometers, correct? 7 A. Correct. 8 Q. It's just something that you personally, 9 Dr. Spear, do not agree with, correct? 10 A. Well, not just me personally, but there's an 11 accumulating -- I mean I think that, hopefully, the risk 12 of asbestos will eventually look at short fibers, not just 13 long fibers. The reason that they were looking at long 14 fibers was simply due to the analytical sensitivity of the 15 method. OSHA's current standard of 0.1 fibers per cc is 16 that level because that is the level of analytical 17 sensitivity; in other words, we have no reliability if 18 we're trying to quantify fibers at lower levels. And so 19 hopefully as technology increases and we can start more 20 consistently evaluating all fibers, then the risk will 21 take into account short fibers. That's my opinion. 22 Q. Okay. So, you know, we've already 23 established, correct, that it is common in industrial 24 hygiene literature to report only those asbestos fibers 25 that are longer than 5 microns in length, correct?</p>	<p style="text-align: right;">136</p> <p>1 A. Yes. 2 Q. When they died, correct? 3 A. Yes. 4 Q. And information related to that. And that 5 mortality, it becomes -- is compared to their exposure in 6 order to drive the toxicity of the substance, correct? 7 A. Yes. 8 Q. Okay. And so if you were to do an analysis 9 looking at fibers at level "X", given a certain level of 10 the mortality, and then you were to derive a toxicity 11 factor - we can assume that you've just done that for a 12 moment because I don't want to ask too long of a question 13 - but that makes sense, correct? 14 A. Kind of, I guess. 15 Q. Well, determining -- let me make sure we're on 16 the same page. You determine toxicity based on certain 17 exposure levels, correct? 18 A. Yes, and length of exposure. 19 Q. And length of exposure. So you get cumulative 20 exposure, correct? 21 A. Yes. 22 Q. So if the exposure levels are higher at the 23 same length of exposure, you're going to have higher 24 cumulative exposure, correct? 25 A. Yes.</p>
<p style="text-align: right;">135</p> <p>1 A. Yes. 2 Q. Okay. However, if you were to report all 3 fibers, including those that are less than 5 microns, that 4 would, typically, have the effect to increase the amount 5 of fibers that are counted, correct? 6 A. Yes. 7 Q. Okay. So the exposures would appear higher, 8 correct? 9 A. Well, it would be representative of what a 10 person breathes in, whether they're short fibers or long 11 fibers, yes. 12 Q. Okay. But just to make sure we're clear, so 13 let's say somebody had 5 fibers per cc only counting 14 fibers that were 5 microns or longer, if you were to count 15 all fibers, you would expect that person to have a higher 16 exposure measurement, correct? 17 A. Yes. 18 Q. Okay. And although we discussed earlier 19 you're not a toxicologist or an epidemiologist, but as an 20 industrial hygienist, you do understand how exposure 21 quantifications fit into a toxicology analysis, correct? 22 A. Yes. 23 Q. Okay. And one of the data points, for 24 example, on a mortality study would be actual mortality, 25 the people who have died, correct?</p>	<p style="text-align: right;">137</p> <p>1 Q. And thank you for pointing this out. It's 2 that accumulative exposure that is then used and compared 3 against mortality to derive the toxicity of the substance, 4 correct? 5 A. Yes. 6 Q. And that's not specific to asbestos. This is 7 the way you would approach any type of exposure to a 8 hazard if you wanted to derive the toxicity, correct? 9 A. That's correct. 10 Q. Okay. So if you were to -- when evaluating 11 that initial exposure, if you were to include additional 12 fibers, let's say shorter fibers, that would give you a 13 higher exposure measurement, correct? 14 A. Yes. 15 Q. And over the same duration, a higher 16 cumulative exposure, correct? 17 A. Yes. 18 Q. So if you were looking at the exact same 19 analysis, although now you have higher cumulative 20 exposures, that would show a lower level of toxicity for 21 the substance, would it not? 22 A. It could, but I don't think the same points 23 apply to morbidity, either, or disease rates, you know, in 24 a person, what rates actually cause disease prior to 25 mortality.</p>

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<p style="text-align: right;">138</p> <p>1 Q. I'm sorry, I don't follow.      2 A. Well, I just -- I don't agree with that same      3 philosophy in terms of you're talking about mortality      4 studies or people dying from asbestos. I think that to      5 determine risk of asbestos exposure in causing disease, I      6 do think that we have to consider total exposure.      7 Q. Okay. And I'm not contesting that at this      8 moment. But looking at total exposure, if you do get      9 higher exposure because you're counting additional fibers      10 and you use that number to determine cumulative exposure,      11 the toxicity of the substance will be lower, assuming that      12 the mortality end points are the same, correct?      13 A. Because of using -- I understand your point.      14 Q. Okay. And just so I make sure I understand my      15 own point, to the extent that Dr. Amandus, working for      16 NIOSH, may have excluded fibers shorter than 5 microns,      17 that would have the impact of increasing the toxicity of      18 the Libby amphiboles based on the findings of the study,      19 correct?      20 MR. LEWIS: Hold on. I object to that      21 question. That question is very ambiguous. What's the      22 antecedent for the pronoun "that" in your question?      23 Q. (By Mr. Stansbury) Dr. Spear, you seem to      24 understand the question.      25 MR. LEWIS: Well, the question -- that doesn't</p>	<p style="text-align: right;">140</p> <p>1 have followed your suggested method of counting all      2 fibers, correct?      3 A. It could have that effect.      4 Q. Okay. Other than the exclusion of fibers      5 shorter than 5 microns, are there any other statements in      6 Dr. Amandus's paper or any other findings that you find to      7 be unsupportable scientifically?      8 A. Well, no. It was a peer-reviewed article and,      9 certainly, it's been referenced and cited many times.      10 There's always questions on exposure reconstruction.      11 Q. Okay.      12 A. Things like that.      13 Q. Okay. I wanted to walk through a couple parts      14 of this paper, then. And starting on page 2, under      15 "Exposure Measurements":      16 "Samples of airborne dust have been taken in      17 the mill since 1942 and in the mine since 1968. Prior to      18 1969, 336 midget impinger samples were collected by the      19 state of Montana primarily in the dry mill, and after      20 1967, 4116 membrane filter samples of airborne dust were      21 collected by federal agencies (NIOSH, MESA, and MSHA)"      22 NIOSH, MESA, and MSHA, just so the court reporter is clear      23 - "and the company in most areas of the facility (Table      24 II). Before 1974, filter samples were either general area      25 or short-term personal samplings collected over periods</p>
<p style="text-align: right;">139</p> <p>1 make any difference whether -- if the question is      2 improper, it's improper. It's misleading, it's vague,      3 it's also compound.      4 MR. STANSBURY: I'll ask you to, again, not      5 coach the witness.      6 MR. LEWIS: I didn't coach the witness. What      7 did I say to the witness there, Counsel?      8 MR. STANSBURY: Could you please read back the      9 last question, madam court reporter?      10 (The record was read by the court reporter as      11 follows:      12 "QUESTION: And just so I make sure I      13 understand my own point, to the extent that Dr. Amandus,      14 working for NIOSH, may have excluded fibers shorter      15 than" --      16 MR. STANSBURY: Let me try to ask the question      17 in a way that will, you know, address everybody's      18 concerns.      19 BY MR. STANSBURY:      20 Q. To the extent that Dr. Amandus, working for      21 NIOSH, may have under-counted fibers by excluding fibers      22 shorter than 5 microns, by doing so, given the mortality      23 and morbidity end points he worked with, that would have      24 the effect of reporting a toxicity factor in the Libby      25 amphibole that actually may have been higher were he to</p>	<p style="text-align: right;">141</p> <p>1 ranging from 20 minutes to several hours, and were not      2 likely to have reflected the 8-hr TWA exposure."      3 Did I read that correctly, sir?      4 A. Yes.      5 Q. Do you agree with this approach?      6 A. Well, yes, because -- well, I agree. That      7 approach does still take place today.      8 Q. Okay. And MESA, M-E-S-A, that no longer      9 exists by that name, correct?      10 A. Right.      11 Q. What did MESA stand for?      12 A. The Mine Enforcement and Safety      13 Administration, I think.      14 Q. And that was a federal agency --      15 A. Yeah.      16 Q. -- correct --      17 A. Yes.      18 Q. -- or administration. And then MSHA, that's      19 the successor to MESA?      20 A. Yes.      21 Q. And what does MSHA stand for?      22 A. Mine Safety and Health Administration.      23 Q. Okay. And if you could turn to Table III --      24 or page 3, Table II, excuse me. "Table II. Description      25 of Environmental Samples," this reflects where this data</p>

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<p>1    in this paper was collected from, correct?</p> <p>2    A. Yes.</p> <p>3    Q. And 789 of the samples from 1971 to 1981 were</p> <p>4    collected by MESA and/or MSHA, correct, sir?</p> <p>5    A. Yes, sir.</p> <p>6    Q. Forty-eight of the samples from 1967 to '68</p> <p>7    were collected by NIOSH, correct?</p> <p>8    A. Yes.</p> <p>9    Q. And then 336 samples using the mppcf</p> <p>10   measurement were collected from 1956 to 1969 by the State</p> <p>11   of Montana, correct?</p> <p>12   A. Yes.</p> <p>13   Q. And so -- and then the company between 1970</p> <p>14   and 1982 collected 3,279 samples, correct?</p> <p>15   A. That's what the Table II says, yes.</p> <p>16   Q. Okay. And again, this is a peer-reviewed</p> <p>17   study. You have no reason to dispute that, correct?</p> <p>18   A. I'm sorry?</p> <p>19   Q. Again, this is a peer-reviewed study. You</p> <p>20   have no reason to dispute the findings of the table,</p> <p>21   correct?</p> <p>22   A. No.</p> <p>23   Q. Okay. So it's fair to say that the exposure</p> <p>24   data underlying this study was based on a large number of</p> <p>25   samples, correct?</p>	142	<p>1    cause you to have less confidence in this paper?</p> <p>2    A. It could, well, particularly when workers --</p> <p>3    you know, if they're in and out of different locations and</p> <p>4    move a lot.</p> <p>5    Q. Okay. Do you believe they try to take into</p> <p>6    account the idea of individuals moving in and out of</p> <p>7    locations?</p> <p>8    A. I'm sure they did.</p> <p>9    Q. Okay. On Table IV -- excuse me, page 4 Table</p> <p>10   III, now, this table summarizes the average fiber per cc</p> <p>11   values calculated from membrane filter samples collected</p> <p>12   in 1967 through 1962 by location, operation, and year,</p> <p>13   correct?</p> <p>14   A. Um-hmm.</p> <p>15   Q. "Yes," sir?</p> <p>16   A. Yes.</p> <p>17   Q. Okay. And I want to look at a couple of these</p> <p>18   measurements. Specifically, the new wet mill, post '76,</p> <p>19   the average exposure was 0.8 fibers per cc, correct?</p> <p>20   A. I need to make sure I know where you're</p> <p>21   looking at again.</p> <p>22   Q. Sure.</p> <p>23   A. You're on Table III?</p> <p>24   Q. Yes.</p> <p>25   A. You're looking at new wet mill?</p>	144
<p>1    A. There are a large number of samples, yes.</p> <p>2    Q. Okay. Some of which were collected by the</p> <p>3    State of Montana, correct?</p> <p>4    A. Yes.</p> <p>5    Q. And some by various federal agencies, correct?</p> <p>6    A. Yes.</p> <p>7    Q. Okay. Are you familiar with how he derived</p> <p>8    the location operations approach to estimating exposures?</p> <p>9    A. I've looked at it before.</p> <p>10   Q. Okay.</p> <p>11   A. I'm vaguely familiar with it.</p> <p>12   Q. Okay. Do you have any reason to believe that</p> <p>13   using location operations -- well, strike that.</p> <p>14   Is the use of location operations to estimate</p> <p>15   exposures within a facility a common practice in</p> <p>16   industrial hygiene?</p> <p>17   A. Well, we would typically nowadays try to</p> <p>18   divide work forces up into similar exposed groups. And</p> <p>19   they don't necessarily have to be in one location, they</p> <p>20   could be similar groups that work in different locations,</p> <p>21   but I believe this is a method that they used then.</p> <p>22   Q. Okay. And you consider it a reliable method?</p> <p>23   A. Well, I think "reliable" to as reliable as it</p> <p>24   can be.</p> <p>25   Q. Okay. Does the use of location operation</p>	143	<p>1    Q. Yes, post '76, after '76.</p> <p>2    A. Oh, okay.</p> <p>3    Q. That's 0.8 fibers per cc, correct, sir?</p> <p>4    A. Yes.</p> <p>5    Q. And that's based on 1,214 samples, correct?</p> <p>6    A. Yes.</p> <p>7    Q. Do you recall what the MSHA PEL was in 1976?</p> <p>8    A. I don't recall. It could have been 5. I know</p> <p>9    MSHA was always slower than OSHA in changing PEL --</p> <p>10   Q. Right.</p> <p>11   A. -- their limits.</p> <p>12   Q. Right. But it was certainly higher than 0.8,</p> <p>13   correct?</p> <p>14   A. Yes, and it's -- but this number is certainly</p> <p>15   higher than the current, the current exposure limit,</p> <p>16   which --</p> <p>17   Q. The current OSHA PEL or MSHA PEL?</p> <p>18   A. The OSHA PEL.</p> <p>19   Q. Right. Is it your understanding that MSHA or</p> <p>20   OSHA was primarily responsible for regulating the mine?</p> <p>21   A. Well, I think for the mine itself, it was</p> <p>22   MSHA. And then for some of the in-town facilities, I</p> <p>23   believe OSHA would have had some jurisdiction. I've had</p> <p>24   this discussion --</p> <p>25   Q. Right.</p>	145

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<p style="text-align: right;">146</p> <p>1       A. -- before in depositions.      2       Q. Okay. Is it fair to say that for the mill      3 associated with the mine, that would still fall under      4 MSHA's jurisdiction?      5       A. Yes.      6       Q. Okay. And 1976 on, the PEL within that wet      7 mill was below MSHA's PEL, correct?      8       A. Yes.      9       Q. Okay. Moving on, sir, on page 5, there seems      10 to be an issue with converting mppcf to fibers per cc,      11 correct?      12      A. Yes.      13      Q. And this is certainly an analysis that I      14 believe requires some estimation, correct?      15      A. Well, yes. It's very suspect, particularly      16 unless all of the other sampling variables were the same.      17 You know, I mean it's hard to apply that conversion across      18 the board.      19      Q. Right. So that conversion, though, would only      20 have been used for samples that were created prior to      21 1969, correct?      22      A. Yes.      23      Q. Because after 1969, they're using fiber per      24 cc, correct?      25      A. Yes.</p>	<p style="text-align: right;">148</p> <p>1       V, which is the conversion ratio. This appears to be a      2 matrix that compares measurements of mppcf to fibers per      3 cc; is that correct, sir?      4       A. Yes.      5       Q. Have you ever seen the use of a matrix of this      6 form before?      7       A. Very seldom, I guess. Only in these earlier      8 studies pertaining to the -- well, I'm sure it was done      9 with other asbestos work, too.      10      Q. Right. But it wouldn't be done nowadays      11 because we're not using mppcf any more, are we?      12      A. Right.      13      Q. So during this period of transition was when      14 these types of problems arose, correct?      15      A. Yes. And the reason we aren't using million      16 particles per cubic foot any more is because it was highly      17 unreliable and it was very difficult to try to count      18 asbestos fibers using that method, so it's certainly all      19 very unreliable.      20      Q. Okay. Have you ever relied upon a study that      21 used mppcf in its measurements?      22      A. No. I don't know what you mean.      23      Q. Well, you say it's unreliable, measurements      24 that are measured in mppcf. You were citing studies      25 earlier in your expert report that were pre 1965 in some</p>
<p style="text-align: right;">147</p> <p>1       Q. Okay. So to the extent there are any      2 questions over this conversion, that would relate to      3 pre-1969 exposures. Am I correct, sir?      4       A. Yes, wherever they were using million      5 particles per cubic foot.      6       Q. Okay. And those exposures were very high,      7 correct?      8       A. Yes.      9       Q. Nobody disputes that the exposures in the dry      10 mill were well in access of any PEL, correct?      11      A. Say that again.      12      Q. The exposures in the dry mill were, in some      13 cases, over 100 fibers per cc, correct?      14      A. Yes.      15      Q. Okay. And so while there may be some      16 ambiguity in converting the mppcf to fibers per cc, we're      17 still dealing with very large numbers, correct?      18      A. Yes.      19      Q. This is not an instance where we're trying to      20 convert data and seeing whether it fits under a 0.1 or 0.5      21 PEL. We're talking about data that involved measurements      22 that are very high, even if there is some imprecision in      23 the conversion, correct?      24      A. Yes.      25      Q. Okay. And if we look on page 6, we see Table</p>	<p style="text-align: right;">149</p> <p>1 instances.      2       A. Right.      3       Q. Those studies would have used mppcf, correct?      4       A. Yes.      5       Q. So it's not as if Amandus was using data that      6 nobody else had ever used in the published literature,      7 correct?      8       A. Well, right. That was the only choice we had.      9       Q. Right. And given that, is the use of a matrix      10 a reasonable means of trying to convert mppcf to fiber per      11 cc?      12      MR. LEWIS: You mean today? Give some time      13 foundation. You said "is" rather than "was."      14      Q. (By Mr. Stansbury) Well, we're never going to      15 deal with any data post 1967 -- '69 or '70 that's in      16 mppcf's. We're always talking about historical data, are      17 we not?      18      A. Yes.      19      Q. Okay. So given -- dealing with this data in      20 which you do have a comprehensive exposure analysis that      21 goes in an era from mppcf to a time in which we're      22 measuring in fiber per cc, is the use of a matrix a      23 reasonable method for converting mppcf to fibers per cc?      24      A. Yes. I think Amandus was trying to use      25 historical data, as unreliable as it may be. In terms of</p>

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<p style="text-align: right;">150</p> <p>1 identifying fibers, he was trying to use it. He had 2 historical data that he was trying to use. 3 Q. Okay. And is that a reasonable method to do 4 so? 5 A. I'm sure it's been done before. 6 Q. Okay. So he's not an outlier in this regard? 7 A. No. 8 Q. Okay. And if you look on the bottom -- on the 9 middle of page 6, I guess it's the last sentence of the 10 first full paragraph, we see the line: "Due to the lack 11 of exposure data in these areas, estimates before 1968 are 12 considered 'guesstimates.'" 13 Did I read that correctly, sir? 14 A. I want to make sure I know where you're 15 reading that at. 16 Q. Sure; sure, sure. 17 A. Where, where were you at again? 18 Q. Oh, sure. I'm right here -- (indicating.) 19 A. So "due to the lack of exposure," that's where 20 you started? 21 Q. Yes, sir. 22 A. I do see that, yes. 23 Q. Okay. So he's certainly being very 24 forthcoming over some of the limitations of the data, 25 correct?</p>	<p style="text-align: right;">152</p> <p>1 be, if I'm not mistaken, some effort to address the fact 2 that workers moved throughout the course of the day, 3 correct? 4 MR. LEWIS: I'm going to object. The question 5 is argumentative. The question is a paraphrase. It's not 6 a proper question. Object to the form of the question. 7 Q. (By Mr. Stansbury) Okay, you may answer, sir. 8 A. So we're referring to the last paragraph, 9 then? 10 Q. Yes. 11 A. Yes. He's saying that weighted by the 12 proportion of time a worker employed in a job spent in an 13 LO area. Okay, but again, if there's workers just going 14 through that area, they're not considered in that job 15 class. So that's, that's just, you know, my 16 interpretation. 17 Q. Okay. But the impact, the net impact of not 18 classifying workers who move in and out of areas could 19 both increase or decrease exposure estimates, correct? 20 A. It could. 21 Q. Okay. So it's not necessarily a bias that 22 would have a specific impact of increasing or decreasing 23 in one way for certain, correct? 24 A. Yeah, it's a bias I don't know how you would 25 measure unless you had a pump on each person as they</p>
<p style="text-align: right;">151</p> <p>1 A. Yes. 2 Q. Later, in the next sentence -- the next 3 paragraph, actually, he says: 4 "However, the 'guesstimates' for those LOs 5 prior to 1968 had a small effect on the average cumulative 6 exposure estimate for the overall cohort, and on the 7 estimates of the exposure-response curves, because a small 8 number of workers was employed in these areas." 9 Did I read that correctly, sir? 10 A. You read that correctly. 11 Q. Do you believe that's a relevant qualification 12 for the guesstimate issue that he himself has flagged? 13 A. Well, it is in the aspect that when he's 14 looking at number of workers employed under a given job 15 class in these areas, but it does not really factor in 16 employees that have to go through those area, or even in 17 it's intermittently, that do not have that job class. So 18 that would be the only caveat I would add. 19 Q. So that might have the impact of 20 underestimating exposure? 21 A. Well, or just not determining exposure to all 22 workers because they weren't in that job class. There 23 were other workers who went through that area who were 24 exposed. 25 Q. Okay. The next paragraph, there does seem to</p>	<p style="text-align: right;">153</p> <p>1 walked through these areas -- 2 Q. Right. 3 A. -- but that wasn't done. 4 Q. But given the data that they had, this was 5 again a reasonable means of trying to compensate for that? 6 A. Sure. 7 Q. Okay. Could we move to page 10, please, the 8 "Discussion"? I'm going to read beginning with the first 9 sentence under there: 10 "The questionable accuracy of the exposure 11 estimates before 1968 is recognized. Key factors that 12 need to be considered in estimating exposure are 13 precision, time periods for combining samples, estimators, 14 the conversion ratio, and assumptions as to exposures in 15 areas where samples have not been taken. In most studies 16 such as ours, there is little one can do but work within 17 the constraints of the available data." 18 Did I read that correctly, sir? 19 A. Yes. 20 Q. Do you agree with that statement? 21 A. Yes. 22 Q. Okay. And again, just so we're clear, the 23 guesstimate, that question applies to exposures that 24 occurred prior, 1968 and earlier, correct? 25 A. Well, in talking about specific exposure</p>

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<p style="text-align: right;">154</p> <p>1 results or quantification, yeah.      2 Q. Yes.      3 A. I mean, obviously, exposure areas where      4 samples have not been taken, well, obviously, we don't      5 have any exposure data, do we?      6 Q. Right. But there was, there was an attempt to      7 address that, was there not?      8 A. Right.      9 Q. And that would be Table VI of the report,      10 correct, sir?      11 A. Yes.      12 Q. So once again, they are making a reasonable      13 effort to compensate for any limitations of the historical      14 data, correct?      15 A. I think they were doing the best they could do      16 with the data they had.      17 Q. Okay. Are there any -- strike that. Do you      18 know of any other literature other than -- let me back up      19 one second.      20 Dr. McDonald also did a study of this population,      21 correct?      22 A. Yes.      23 Q. And is it fair to say that his exposure      24 analysis has some of the same virtues and limitations that      25 we just discussed with respect to Dr. Amandus's study?</p>	<p style="text-align: right;">156</p> <p>1 A. Yes.      2 Q. Okay. And that was also -- the Sullivan paper      3 was a peer-reviewed, published paper, correct?      4 A. Yes.      5 Q. Okay. Now, when going through your report, we      6 identified a lot of sections as dealing with Grace's      7 conduct, correct?      8 A. Yes.      9 Q. And in reaching these opinions, you developed      10 a certain amount of familiarity with the Libby vermiculite      11 mining and milling operation as a whole, correct, sir?      12 A. In reaching these opinions?      13 Q. In reaching your opinions characterizing --      14 well, let me ask it a little bit differently.      15 In order to assess Grace's conduct, you first had to      16 become very familiar with the Libby vermiculite mining and      17 milling operation as a whole, correct?      18 A. Yes. I have been, I have been assessing this      19 situation since 1996, and my opinions have not changed      20 regardless of research that I've done in terms of how I      21 think Grace behaved or the hazards of Libby amphibole.      22 Q. Right. And I guess the point I'm trying to      23 reach, though, in reaching your opinions, you had to learn      24 about what actually happened year in and year out at the      25 mining operation in Libby, correct?</p>
<p style="text-align: right;">155</p> <p>1 A. Yes.      2 Q. Okay. Other than Dr. Amandus and      3 Dr. McDonald's papers, are you aware of any other      4 published literature which more accurately captures the      5 exposure experience within the Libby facility?      6 A. Involving the mine, no.      7 Q. Let me ask that again because you're right, I      8 should have clarified. Other than Amandus and McDonald's      9 papers, are you aware of any other published report that      10 more accurately characterizes the asbestos exposure      11 experience in the Libby vermiculite mining and milling      12 operation?      13 A. No.      14 Q. Are you aware of any unpublished papers or      15 reports that more accurately characterize the asbestos      16 exposure conditions in the Libby vermiculite mining and      17 milling operation?      18 A. I'm not.      19 Q. Okay. And you're familiar with the Sullivan      20 paper. You mentioned it earlier, correct?      21 A. Yes.      22 Q. That was published in 2008? 2007?      23 A. Pretty recently, yes.      24 Q. Fairly recently. The exposure data for that      25 paper was Amandus's paper that we just reviewed, correct?</p>	<p style="text-align: right;">157</p> <p>1 A. Yes.      2 Q. Okay. So it is certainly an area where you      3 consider yourself to be very familiar?      4 A. Yes.      5 Q. Okay. And part of the Libby operation      6 involved sending ore elsewhere, correct?      7 A. Yes.      8 Q. Okay. And this was unexpanded vermiculite,      9 correct?      10 A. Yes.      11 Q. And was there asbestos in that vermiculite?      12 A. Yes.      13 Q. And that asbestos would go where -- or, excuse      14 me, that vermiculite would go where?      15 A. Well, the vermiculite would go to expanding      16 plants across the country.      17 Q. Okay. Some of those plants were owned by      18 Grace, correct?      19 A. I believe some of them were.      20 Q. And some of them were not, correct?      21 A. Yes.      22 Q. For example, O.M. Scott, the fertilizer      23 manufacturing facility, expanded vermiculite, did they      24 not?      25 A. Yes.</p>

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<p>158</p> <p>1 Q. Okay. So that would be an example of an 2 expanding operation that was not owned by Grace, correct? 3 A. Yes. 4 Q. Okay. And the workers in those plants would 5 have been at risk of being exposed to asbestos, correct? 6 A. Yes. 7 Q. And in the case of the Marysville, Ohio 8 facility, they were in fact exposed to asbestos, correct? 9 A. Yes. 10 Q. Okay. And you have no reason to believe that 11 that would be any different in the numerous other 12 expanding plants all across the country, correct? 13 A. That workers were exposed to asbestos? 14 Q. Yes. 15 A. No. 16 Q. Right. It occurred all over the country, did 17 it not? 18 A. Yes. 19 Q. Okay. Now, are you familiar with the various 20 products that were generated using Libby vermiculite? 21 A. I am somewhat familiar with the products. 22 I've looked through the, you know, the exhibits over time 23 and saw they used it in cement and -- 24 Q. So let's, if we can -- which products are you 25 familiar with?</p>	<p>160</p> <p>1 Q. And what were the findings of that analysis? 2 A. Well, they're very preliminary. In fact, 3 they're still being worked up but -- so it's, I mean we -- 4 fibers were detected in areas outside of the plant that is 5 no longer there. 6 Q. Okay. So this is just one example; however, 7 in this example, it illustrates that people outside of an 8 expanding plant outside of Libby - in this case, Spokane - 9 may have been exposed to asbestos that was released during 10 the expanding process, correct? 11 A. I suppose that's correct. And then the other 12 work would be - you said outside of Libby - would be 13 associated with the vermiculite grant that we're currently 14 working doing the homes. 15 Q. And this is -- oh, this is what we were 16 speaking about earlier, looking at the attic insulation. 17 A. Right. 18 Q. Right. And so that -- and, okay. Is it fair 19 to say there may be some distinctions there, though? With 20 the attic insulation, you have exposure to 21 already-expanded vermiculite, correct? 22 A. Yes. 23 Q. But there's still asbestos in it, right? 24 A. Yes. 25 Q. So there could be an exposure, correct?</p>
<p>159</p> <p>1 A. I don't know, Monokote; I don't know, other 2 types of cement products I've seen in the exhibits; the 3 insulation; foundation insulation. 4 Q. Okay. So like, for example, Monokote-3 -- 5 A. Yes. 6 Q. -- that contained vermiculite and chrysotile, 7 correct? 8 A. I believe so. 9 Q. So a person who was exposed to Monokote-3 may 10 have been exposed to asbestos from Libby. 11 A. Yes. 12 Q. Okay. Similarly, a person who had Zonolite 13 attic insulation in their home, they could have been 14 exposed to asbestos from Libby, correct? 15 A. Yes. 16 Q. Okay. And to the extent that there were 17 expanding operations in various cities, to the extent that 18 there was -- well, let me rephrase this. 19 Have you studied exposures to asbestos from Libby 20 that occurred outside of Libby? 21 A. We have done some preliminary work in Spokane. 22 Q. What kind of work is this? 23 A. It was, again, through the COBRE grant. And 24 we basically did a very preliminary survey of 25 neighborhoods surrounding the Spokane expanding plant.</p>	<p>161</p> <p>1 A. We're talking about the attic insulation? 2 Q. Yes. 3 A. Yes. 4 Q. An expanding plant, by its very nature, you 5 have unexpanded vermiculite going in, correct? 6 A. Yes. 7 Q. So the people there may have been exposed to 8 unexpanded vermiculite, correct? 9 A. As well as after it's expanded. 10 Q. Right. So, but it -- certainly, the exposure 11 one would have to unexpanded vermiculite would be 12 different, potentially, in terms of potential intensity 13 than an exposure to expanded vermiculite, correct? 14 A. I mean it could be. I don't know if I've seen 15 enough data to draw any conclusions on that. 16 Q. Now, within the Libby community, is it fair to 17 say you have people - not workers, putting workers aside - 18 within the Libby community, is it fair to say that you 19 have people who were exposed in Libby to both unexpanded 20 and expanded vermiculite? 21 A. Yes. 22 Q. What would be potential expanded vermiculite 23 -- let me rephrase that. 24 What would be an example of expanded vermiculite 25 exposures that would occur in Libby?</p>

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<p style="text-align: right;">162</p> <p>1 A. Of expanded or unexpanded?</p> <p>2 Q. Expanded.</p> <p>3 A. Of expanded, the vermiculite attic insulation.</p> <p>4 Q. Okay.</p> <p>5 A. I believe some expanded stuff was used in some 6 of the gardens or the lawns, and then people were 7 expanding it themselves on their stoves to watch it pop.</p> <p>8 Q. That's right. But that would actually be an 9 exposure to unexpanded that became expanded, correct?</p> <p>10 A. Expanded, yeah, I don't know.</p> <p>11 Q. But what exposures to unexpanded vermiculite 12 occurred within the Libby community?</p> <p>13 A. Well, I think to the processed ore being 14 hauled into Libby, for one; as well as material that was 15 transported across the river and then brought into the 16 town by railroad car, and then leaks occurred and 17 contaminated areas around the railroad.</p> <p>18 Q. So these leaks caused expansion -- so these 19 leaks around the railroad caused exposure to unexpanded 20 vermiculite in Libby, correct?</p> <p>21 A. You asked about unexpanded, right?</p> <p>22 Q. Yes, sir; yes.</p> <p>23 A. I believe that the EPA has found unexpanded 24 vermiculite in some of the operable units they're now 25 currently trying to clean up.</p>	<p style="text-align: right;">164</p> <p>1 Q. (By Mr. Stansbury) And this is northeast of 2 Libby, correct, sir?</p> <p>3 A. Yes.</p> <p>4 Q. Okay. And Location 1 appears to be just north 5 of the mine, correct?</p> <p>6 A. Well, Location 1 was actually right up at the 7 mine site itself, I think.</p> <p>8 Q. Okay. So you put that on mine property?</p> <p>9 A. Yes.</p> <p>10 Q. Okay. Location 2 appears to be north of the 11 mine. Is that, is that a fair statement, sir?</p> <p>12 A. Yes, going down the road a ways.</p> <p>13 Q. How far from the mine would you say Location 2 14 is?</p> <p>15 A. Probably a couple miles. I guess as the road 16 travels, a couple miles; less by -- less as the crow 17 flies.</p> <p>18 Q. And then Location 3 occurred at what appears 19 to be the intersection of Highway 37 and Rainey Creek 20 Road; is that correct, sir?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. Now, Location 1 and 2, can I just walk 23 up there right now and sample that if I wanted to myself?</p> <p>24 A. If you got permission from EPA, you could.</p> <p>25 Q. I need permission from EPA, right, because</p>
<p style="text-align: right;">163</p> <p>1 Q. And particularly with respect to the railroad 2 exposures, those would also occur or could have occurred 3 outside of Libby as well, correct?</p> <p>4 A. I would say so, yes.</p> <p>5 Q. Okay. Let me rephrase that a little bit more 6 artfully. People outside of Libby may have been exposed 7 to unexpanded vermiculite through leaks from railcars, 8 correct?</p> <p>9 A. Yes.</p> <p>10 Q. And that would have meant -- that could have 11 meant exposure to actual asbestos from those railcars, 12 correct?</p> <p>13 A. Yes.</p> <p>14 Q. Libby asbestos, correct?</p> <p>15 A. Yes.</p> <p>16 Q. Okay. I'd like to go back to your 2006 paper. 17 I believe it's Exhibit 3. I'm looking on page 2, and 18 there's a picture of a map on page 2. That's Libby, 19 correct -- or that's actually an area outside of Libby, 20 correct?</p> <p>21 A. Yeah, that's showing the mine road there.</p> <p>22 MR. STANSBURY: All right. And just so the 23 record is clear, by page 2, I mean page 461 of the 24 published paper, but I think Dr. Spear understood what I 25 meant.</p>	<p style="text-align: right;">165</p> <p>1 that's a restricted area, correct?</p> <p>2 A. Right.</p> <p>3 Q. People just can't walk into either Location 1 4 or 2 that you sampled, right?</p> <p>5 A. That is correct.</p> <p>6 Q. What about Location 3?</p> <p>7 A. Location 3 was just right off the highway, so 8 that's open to access.</p> <p>9 Q. Okay. So it's fair to say that the average 10 person is not wandering around Location 1 or 2 on any 11 given day, correct?</p> <p>12 A. I hope not.</p> <p>13 Q. Unless they're wearing a protective suit.</p> <p>14 Okay. Now, you say on page 461, page 2 of the document, 15 looking at the left-hand column, second paragraph, last 16 sentence, tell me if I read this correctly: 17 "Since asbestos fibers are durable silicates 18 and do not decompose in the environment, the airborne 19 asbestos fibers released and dispersed from the Libby mine 20 and processing areas throughout 70 years of operation have 21 likely deposited throughout the surrounding areas."</p> <p>22 Did I read that correctly, sir?</p> <p>23 A. Yes.</p> <p>24 Q. And this study looked at the depositing of fibers in bark, correct?</p>

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<p style="text-align: right;">166</p> <p>1 A. Yes.</p> <p>2 Q. Do you have any way of knowing whether the 3 asbestos in a given bark, bark sample, was released 20 4 years ago as opposed to 40 years ago?</p> <p>5 A. Not in samples collected in this area, we 6 don't. We've collected samples outside of the mine sites 7 in what's called the - I'm trying to think of the name - 8 the Forest Service has a testing facility where they have 9 larch trees or some type of tree. And all of those trees 10 were planted after the mine was shut down, and we've done 11 bark sampling in there and we've found fibers.</p> <p>12 Q. Okay. But that would be part of that study 13 you mentioned earlier, correct, the forestry? That's part 14 of your forestry study?</p> <p>15 A. Well, actually, it's been -- it's part of, 16 kind of, a method to determine along -- you know, EPA has 17 now done a lot of bark sampling in lines going out from 18 the mine using our method, and basically -- so we 19 basically started the work in trying to find out how far 20 from the mine have they gone, so it's part of that work. 21 We did do additional bark sampling as part of the Forest 22 Service study. You are correct there.</p> <p>23 Q. Okay. And that, that analysis, though, has 24 not been discussed in your expert report. We didn't see 25 it when we were looking at your report, correct?</p>	<p style="text-align: right;">168</p> <p>1 Q. Right. And --</p> <p>2 A. So then after we realized those were all 3 negative and it doesn't seem very plausible they'd be 4 taken up in the root system, we discontinued that 5 approach.</p> <p>6 Q. What about the soil samples? Did you publish 7 the soil sample results?</p> <p>8 A. They were not published as part of this paper 9 and I don't even know what the results are.</p> <p>10 Q. So you don't know whether there was asbestos 11 in the actual soil there?</p> <p>12 A. Yeah, I can't recall what happened to the soil 13 samples.</p> <p>14 Q. Okay. Are you familiar with the term 15 "naturally occurring asbestos"?</p> <p>16 A. Yes.</p> <p>17 Q. Now, I think that's -- I've been told in some 18 ways that's kind a misnomer, in that all asbestos is 19 naturally occurring.</p> <p>20 A. Right.</p> <p>21 Q. But what I'm speaking of particularly is 22 asbestos, and particularly the Libby amphibole, that was 23 not released as part of Grace's vermiculite operation. 24 Are you familiar with what I'm talking about?</p> <p>25 A. Yes.</p>
<p style="text-align: right;">167</p> <p>1 A. That's correct.</p> <p>2 Q. Okay. But for this paper, you were not able 3 to tell when the asbestos was actually released, correct?</p> <p>4 A. That would be correct.</p> <p>5 Q. Okay. Moving to page 462, page 3 of the 6 document, looking at the table, and I see results here for 7 tests that were done on various locations. I see three 8 samples for Location 1; is that correct?</p> <p>9 A. Yeah, so Location 1, three samples.</p> <p>10 Q. And are those all bark samples?</p> <p>11 A. Yes, they would all be bark samples.</p> <p>12 Q. One question I had, if we could move, the same 13 page but on the right column, I guess five lines down from 14 the top: "Tree core samples were only collected from the 15 locations surrounding the mine in the initial sampling 16 program."</p> <p>17 Did I read that correctly, sir?</p> <p>18 A. Yes.</p> <p>19 Q. What are the tree core samples?</p> <p>20 A. When we began doing the bark sampling, we 21 wanted to make sure we covered all bases, so we did take 22 soil samples near the tree, we also took bark samples, and 23 then we did tree core samples to make sure that the fibers 24 were not being taken up by the root system and would be 25 inside the tree, basically.</p>	<p style="text-align: right;">169</p> <p>1 Q. Do you have an opinion about, and we're going 2 to just use the term "naturally occurring asbestos"?</p> <p>3 A. Yes.</p> <p>4 Q. What is your opinion?</p> <p>5 A. My opinion is that in over thousands of years 6 with deposits up there on the hill and natural erosion, 7 that there could be some naturally occurring asbestos, but 8 I think that the releases from that compared to releases 9 from activities associated with the mine would be, would 10 be much less.</p> <p>11 Q. Where would the naturally occurring asbestos 12 be located?</p> <p>13 A. What do you mean "be located"?</p> <p>14 Q. Well, I mean, for example, if I'm in the 15 center of Libby, you know, let's say St. John's Hospital, 16 is there naturally occurring asbestos in the soil right 17 there?</p> <p>18 A. Well, I don't know that.</p> <p>19 Q. Okay. Do you have an opinion as to where 20 naturally occurring asbestos would most likely be found in 21 the Lincoln County area?</p> <p>22 A. I guess I don't.</p> <p>23 Q. Okay.</p> <p>24 A. I mean in terms -- are you referring to 25 asbestos that moved somewhere else, or what's in the</p>

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<p style="text-align: right;">170</p> <p>1 actual mineral deposits that existed?</p> <p>2 Q. Mineral deposits the existed.</p> <p>3 A. Yeah, I think it could be -- I think it's been</p> <p>4 found in some of the river areas, if I remember right, and</p> <p>5 I don't spend a lot of time reading the mineralogy</p> <p>6 journals, but -- (pause.)</p> <p>7 Q. Right. Are you aware if there are any</p> <p>8 mineralogical differences between the Libby amphiboles</p> <p>9 that were released from the vermiculite mining operation</p> <p>10 as opposed to those Libby amphiboles that have occurred</p> <p>11 naturally?</p> <p>12 A. You're referring to the Gunter papers,</p> <p>13 probably?</p> <p>14 Q. Yes.</p> <p>15 A. I believe he's contending that just recently,</p> <p>16 yes, that if it doesn't have the sodium/potassium peak,</p> <p>17 then it's not from the mine. So I'm aware of some of that</p> <p>18 work, yes.</p> <p>19 Q. Did you in any way when conducting this -- let</p> <p>20 me start over.</p> <p>21 Have you analyzed any of your samples using</p> <p>22 Dr. Gunter's analysis to determine whether the asbestos</p> <p>23 that you detected was from the mining and milling</p> <p>24 operation as opposed to naturally occurring asbestos?</p> <p>25 A. Well, we haven't -- for one thing, I'm not,</p>	<p style="text-align: right;">172</p> <p>1 whether or not they were from the mining and milling</p> <p>2 operation as opposed to just naturally occurring asbestos,</p> <p>3 correct?</p> <p>4 A. We could do that. I mean we have the peaks,</p> <p>5 like I'm trying to tell you.</p> <p>6 Q. But you haven't reported that, correct?</p> <p>7 A. No, we have not reported that.</p> <p>8 Q. Okay. Nor have you, sitting here today,</p> <p>9 analyzed these data for those purposes?</p> <p>10 A. No.</p> <p>11 Q. Okay. Looking back at Table 1, it looks, if</p> <p>12 I'm not mistaken, and correct me if I'm wrong, that there</p> <p>13 were quite a few amphibole fibers in the tree bark from</p> <p>14 sample 1A on Location 1, correct?</p> <p>15 A. Yes.</p> <p>16 Q. And 530 million amphibole fibers per gram of</p> <p>17 bark. Did I read that correctly?</p> <p>18 A. So which sample are we looking at again?</p> <p>19 Q. I'm looking at the first sample, Location 1,</p> <p>20 amphibole fiber per gram of bark.</p> <p>21 A. Yes.</p> <p>22 Q. So that translates to 100 million fibers per</p> <p>23 cc, correct?</p> <p>24 A. Yes.</p> <p>25 Q. And would that number include fibers less than</p>
<p style="text-align: right;">171</p> <p>1 I'm not -- I think there's a lot of variability in what we</p> <p>2 would find in given deposits. In other words, when Meeker</p> <p>3 did his work, he looked at, you know, a larger number of</p> <p>4 samples than previous researches, and now Gunter has</p> <p>5 looked at many more samples. So I think that, you know,</p> <p>6 there's going to be variability in what we see based on</p> <p>7 the number of samples, and I think that Gunter is drawing</p> <p>8 some conclusions that I'm not saying I'm going to agree</p> <p>9 with.</p> <p>10 But in terms of your question, you know, we sent all</p> <p>11 our samples in for transmission electron microscopy so we</p> <p>12 get the peaks with the results. And I can only tell you</p> <p>13 the only ones I've looked at would be the recent ones that</p> <p>14 we've done, because I haven't had time to go back and look</p> <p>15 at the other ones, but I think I will. And we found the</p> <p>16 sodium/potassium peaks in 60 percent of the last batch of</p> <p>17 samples we've taken from the forest.</p> <p>18 Q. Okay. And those peaks would suggest that they</p> <p>19 were actually from the milling operation?</p> <p>20 A. From the mine.</p> <p>21 Q. Mine.</p> <p>22 A. What Gunter is calling "the mine."</p> <p>23 Q. Right, the mine. This 2006 paper, though, the</p> <p>24 samples that were reported in this paper, you've in no way</p> <p>25 analyzed them in a method that would enable you to say</p>	<p style="text-align: right;">173</p> <p>1 5 microns?</p> <p>2 A. Yes.</p> <p>3 Q. Okay. So in this table, you haven't</p> <p>4 differentiated between fibers that are shorter than</p> <p>5 5 microns and those that are longer, correct?</p> <p>6 A. Yeah. The process that we use is called AHERA</p> <p>7 TEM, basically. And so we ask the lab to report results</p> <p>8 back for all fibers greater than 0.1 micrometers in</p> <p>9 length. So we get it broken down by -- we got it broken</p> <p>10 down by less than 5, greater than 5.</p> <p>11 Q. Would that include cleavage fragments as well?</p> <p>12 A. No.</p> <p>13 Q. Okay. But it would include fibers less than</p> <p>14 5 microns in length.</p> <p>15 A. Correct.</p> <p>16 Q. Okay. So it would, this would be a</p> <p>17 distinct -- well, let me rephrase that.</p> <p>18 In order to compare these data to, let's say,</p> <p>19 Amandus's data, you would need to exclude fibers less than</p> <p>20 5 microns in order to do an apples-to-apples comparison,</p> <p>21 correct?</p> <p>22 A. Well, yeah, these are bark samples. I mean we</p> <p>23 aren't talking about air samples.</p> <p>24 Q. These are just bark samples.</p> <p>25 A. These are bulk samples.</p>

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<p>1       Q. Right. So these -- so that's a fair point.  2 So these are not directly correlated to airborne  3 exposures, right?  4       A. No. These are, these are media samples.  5 These are samples in a given media like bark.  6       Q. Okay.  7       A. I would certainly make no attempt to compare  8 it to, you know, airborne.  9       Q. Would you be willing to offer an opinion as to  10 what the potential airborne exposures would be from these  11 trees given those measurements, those bulk measurements?  12       A. Well, just looking at the amount in bark, no,  13 because again, that's why we've tried to conduct other  14 studies. We're trying to find out: Well, if it's in the  15 media, then how does it get out of the media?  16       Q. Right. And that's what your 2007 study  17 relates to, correct?  18       A. Right.  19       Q. So this study, this would not support an  20 opinion that there are actual exposures occurring because  21 of the asbestos that had been trapped in the barks of  22 trees. This study merely identifies the presence of  23 asbestos fibers in the barks of trees, correct?  24       A. It supports the scientific hypothesis that  25 asbestos fibers traveled through the air and deposited on</p>	174	<p>1       Q. And that translates to 5.8 million fibers per  2 cubic -- per square centimeter, correct?  3       A. Yes.  4       Q. Now, one thing I noticed was the analytical  5 sensitivity for Location 5 as opposed to Location 4. And  6 analytical sensitivity, is that the lowest level that you  7 would be able to detect? How would you describe  8 "analytical sensitivity"?</p> <p>9       A. It's the lowest detect limits for a fiber that  10 a lab can do and get repeatable results. So depending on  11 what method you're collecting samples by, whether you're  12 doing like PCM analysis where they just count fibers, that  13 has a different analytical sensitivity than when they're  14 doing TEM on an air sample. And then when they're doing  15 bulk sample, so these are essentially bulk analysis,  16 there's going to be a different analytical sensitivity  17 associated with that.</p> <p>18       Q. And so if I understand that correctly, 19  19 million was the analytical sensitivity for the sample from  20 Albany, New York, correct?</p> <p>21       A. Yes.</p> <p>22       Q. And the one, the analytical sensitivity for  23 Location 5 which was in Libby by the rail station was 1.2  24 million, correct?</p> <p>25       A. Yes.</p>	176
<p>1       these trees.  2       Q. Okay. But as we stated earlier, you didn't  3 differentiate between fibers that were naturally occurring  4 as opposed to those that were released from the Grace  5 mining/milling operation, correct?  6       A. Well, in this particular paper. I told you we  7 have looked at bark samples from the same area and they  8 contained the sodium/potassium peaks.  9       Q. But you haven't reported or produced those  10 findings?  11       A. No, we haven't.  12       Q. Okay. And you certainly haven't produced them  13 in this case, correct?  14       A. That's correct.  15       Q. Okay. Looking back at the table, Location 4  16 is your control, correct?  17       A. Yes.  18       Q. And that is Albany, New York, and it's a pine  19 tree. And you detected no amphibole fibers, correct?  20       A. Correct.  21       Q. Location 5 is on the rail line, correct?  22       A. Yes.  23       Q. And you detected 19 million amphibole fibers  24 per gram of bark, correct?  25       A. Yes.</p>	175	<p>1       Q. So if there had been 10 million amphibole  2 fibers per gram of bark in the Albany, New York pine, you  3 would not have been able to detect that, correct?  4       A. Well, yeah. It's really based on their  5 ability to be able to count. Usually, TEM analysis in  6 terms of at least an air sample, they want the ability to  7 be able to see 1 fiber per square millimeter of filter  8 that they analyze. Okay? So it's really, I think,  9 related more to the type of material, the bulk of material  10 that they analyze.</p> <p>11       Q. More related to the type. So why was the  12 analytical sensitivity so much lower for Location 5 as  13 opposed to the control group?  14       A. It could be because there's different types of  15 bark, different types of tree. This is a big variable in  16 all this work --</p> <p>17       Q. Right.</p> <p>18       A. -- is different trees have different bark. So  19 that would be the best I can explain it. I mean Jim  20 Webber would be the best person to explain that. He's the  21 analyst.</p> <p>22       Q. But, I mean, just so I -- kind of going back  23 to one of my previous questions: If there had been 10  24 million amphibole fibers per gram of bark in Location 4's  25 sample, it still would have not been detected given that</p>	177

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<p>1 analytical sensitivity, correct?</p> <p>2 A. Well, I don't know if that's entirely</p> <p>3 accurate, because like I say, they do the method so that</p> <p>4 they can detect a certain number of fibers per area of</p> <p>5 what they're analyzing. So I don't know. I see what</p> <p>6 you're going -- I see where you're going with your</p> <p>7 question, but -- (pause.)</p> <p>8 Q. Right. But it's something that --</p> <p>9 A. I don't know if that's right or wrong.</p> <p>10 Q. Okay; okay, that's fair. But Location 7 was</p> <p>11 the Libby Middle School track and there were 0.13 million</p> <p>12 amphibole fibers per gram of bark and 0.25 million</p> <p>13 amphibole fibers per square centimeter, correct?</p> <p>14 A. Yes.</p> <p>15 Q. And again, the detection analytical</p> <p>16 sensitivity for Location 7 was 0.13 million, correct?</p> <p>17 A. Yeah.</p> <p>18 Q. And the amount detected was right at that</p> <p>19 analytical sensitivity level, correct?</p> <p>20 A. Pretty close.</p> <p>21 Q. Needless to say, if the same analytical</p> <p>22 sensitivity used for Location 4 were used on Location 7,</p> <p>23 none would have been detected, correct?</p> <p>24 A. Well, if that analytical sensitivity applied</p> <p>25 to that sample, yeah, but I don't think it does.</p>		<p>1 speak to that either way?</p> <p>2 A. No.</p> <p>3 Q. Okay. And Then Location 8 was Asa Wood</p> <p>4 Elementary School. I take it that is in Libby; is that</p> <p>5 correct?</p> <p>6 A. Yes.</p> <p>7 Q. And there were no fibers detected there,</p> <p>8 correct?</p> <p>9 A. Right.</p> <p>10 Q. So we see a great range of asbestos in the</p> <p>11 trees, with one end of the spectrum being Location 1,</p> <p>12 which is, as you said, on the mine site; with Asa Wood</p> <p>13 Elementary in town, where no fibers were detected in the</p> <p>14 bark, correct?</p> <p>15 A. Exactly. We were trying to do that very</p> <p>16 thing. We wanted to start at the mine and then go out.</p> <p>17 Q. Okay. Of course, as I said earlier, Locations</p> <p>18 1 and 2 where you had the highest exposures, people just</p> <p>19 can't walk onto those areas without first getting</p> <p>20 clearance in EPA, correct?</p> <p>21 A. Right.</p> <p>22 Q. Okay. In doing your analysis, did you ever</p> <p>23 try to identify whether there was any vermiculite deposits</p> <p>24 within the bark?</p> <p>25 A. I guess I don't understand that question.</p>	
	179		181
<p>1 Q. Why is that?</p> <p>2 A. Well, because I've tried to explain what I</p> <p>3 know about it, is the fact that it's going to depend upon</p> <p>4 the sample preparation, the type of bark, the amount of</p> <p>5 bark that they use. I mean, for example, if I collected</p> <p>6 air samples and I send in five different air samples to a</p> <p>7 lab for TEM analysis, the analytical sensitivity for every</p> <p>8 one of those samples is going to be different because of</p> <p>9 the volume of air that we collect.</p> <p>10 Q. Right. So the -- I understand why you have</p> <p>11 different sensitivities; however, the sensitivity is still</p> <p>12 a, if you will, a cutoff point below which you cannot</p> <p>13 reliably report the data, correct?</p> <p>14 A. In that sample, yeah.</p> <p>15 Q. Right. And so to the extent that there -- if</p> <p>16 there had been, for whatever reason, a 19 million fibers</p> <p>17 per gram analytical sensitivity for Location 7, it</p> <p>18 certainly would not have been able to detect the 0.13</p> <p>19 million amphibole per gram of bark that you reported,</p> <p>20 correct?</p> <p>21 A. Well, yeah, again, if that sensitivity applied</p> <p>22 to those different samples. I mean I would have to say</p> <p>23 what I'd say before. I don't know if that's accurate or</p> <p>24 not.</p> <p>25 Q. Okay. So sitting here today, you really can't</p>		<p>1 Q. Well, is -- vermiculite dust, can that be</p> <p>2 transferred through the air?</p> <p>3 A. Oh, sure, I'm sure it could.</p> <p>4 Q. And vermiculite dust could have ended up on</p> <p>5 the bark of tree as well, correct?</p> <p>6 A. Sure.</p> <p>7 Q. And if there was a high level of vermiculite</p> <p>8 dust in the tree, that would, perhaps, suggest that the</p> <p>9 dust had come from the mining and milling facility as</p> <p>10 opposed to naturally occurring asbestos, correct?</p> <p>11 A. Because vermiculite can't be naturally</p> <p>12 occurring? I'm not following your logic.</p> <p>13 Q. Well, I mean, vermiculite -- it occurs in</p> <p>14 Vermiculite Mountain, correct?</p> <p>15 A. Yeah.</p> <p>16 Q. And that's the primary source of vermiculite</p> <p>17 in the area, correct?</p> <p>18 A. Yeah.</p> <p>19 Q. So to the extent that there was vermiculite in</p> <p>20 tree bark, what other sources of vermiculite would you</p> <p>21 attribute that to other than from Vermiculite Mountain?</p> <p>22 A. Well, I wouldn't attribute it to any.</p> <p>23 Q. Right. And so would that have been a way of</p> <p>24 determining whether some of this asbestos was actually</p> <p>25 coming from Vermiculite Mountain, whether there was</p>	

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<p>1    actually vermiculite dust located there as well?</p> <p>2    A. I guess it could have been.</p> <p>3    Q. Okay.</p> <p>4    A. I mean we were studying asbestos, but --</p> <p>5    (pause.)</p> <p>6    Q. Right. So there's no, in any of these studies</p> <p>7    -- no time in any of these did you actually identify</p> <p>8    whether vermiculite itself was present, correct?</p> <p>9    A. Well, not to my knowledge. I haven't seen all</p> <p>10   of the scans from all of these different samples, either,</p> <p>11   so --</p> <p>12   Q. But it certainly hasn't been reported in the</p> <p>13   papers?</p> <p>14   A. It hasn't been reported in the papers.</p> <p>15   Q. Right. And you certainly haven't produced</p> <p>16   that in this case.</p> <p>17   A. (Nodding head affirmatively.)</p> <p>18   Q. Now, on page 464, the last paragraph before</p> <p>19   "Discussion":</p> <p>20         "SEM observation revealed that the amphibole</p> <p>21   fibers were deposited on the surface of the bark and not</p> <p>22   through its depth. Most of the fibers were located in the</p> <p>23   crevices and wrinkles of the bark rather than on its</p> <p>24   smooth surfaces."</p> <p>25   Did I read that correctly, sir?</p>	182	<p>1    for - classification. I mean I can go out and look at a</p> <p>2    tree and I don't know what kind of tree it is. So that's</p> <p>3    about all I can say about that. I mean that's -- the</p> <p>4    question that we always get is, you know: How does bark</p> <p>5    relate to all of this?</p> <p>6    Q. Right.</p> <p>7    A. Or tree species.</p> <p>8    Q. Right. And so sitting here today, you have no</p> <p>9    opinion as to how that would impact your data?</p> <p>10   A. Well, tree species, we only sample at a</p> <p>11   certain distance where we can reach a tree. I mean if you</p> <p>12   go -- what happens if you go up into a tree? Are there</p> <p>13   fibers loosely held on the pine needles? You know, this</p> <p>14   is just very exploratory.</p> <p>15   Q. Right. And at this point, you know, there</p> <p>16   were, there were eight samples, one of which was a</p> <p>17   control, so -- actually, I don't see a Sample 6, so I</p> <p>18   guess there were seven samples, one of which was a</p> <p>19   control; so six actual samples, two of which were in the</p> <p>20   restricted area, and one of which was also right at the</p> <p>21   intersection the Rainey Creek Road and Highway 37,</p> <p>22   correct?</p> <p>23   A. Yes.</p> <p>24   Q. Do you believe that those samples and the</p> <p>25   findings in those samples are representative of the forest</p>	184
<p>1    A. Yes.</p> <p>2    Q. Could you explain in lay terms what that</p> <p>3    means?</p> <p>4    A. Well, it just means if you look -- I think the</p> <p>5    easiest way is just to look at the pictures. It refers</p> <p>6    you to these pictures.</p> <p>7    Q. I like pictures.</p> <p>8    A. Well, I mean, you know, so the purpose of the</p> <p>9    pictures is that you look at Figure 2 and you can see</p> <p>10   certain long fibers. And then you look at exactly the</p> <p>11   same spot on the micrograph that was blown up to larger</p> <p>12   magnification, and you start to see many more fibers that</p> <p>13   are embedded deeper into the bark. So you look at the</p> <p>14   bark surface under a microscope. As you could imagine,</p> <p>15   it's going to be rough and a lot of little crevices and</p> <p>16   stuff. So basically, it just -- it works its way into the</p> <p>17   crevices and stays there.</p> <p>18   Q. Now, do trees shed their bark over time?</p> <p>19   A. Some do.</p> <p>20   Q. Do you know whether these particular trees do?</p> <p>21   A. I think some of these species do. I'm not a</p> <p>22   botanist so I'm not going there.</p> <p>23   Q. Who is the botanist on this?</p> <p>24   A. Well, we had, early on we had a student who</p> <p>25   was doing some of the bark - what's the word I'm looking</p>	183	<p>1    in Lincoln County in general?</p> <p>2    A. Well, you don't have to rely on my -- or our</p> <p>3    paper for this particular question because all you have to</p> <p>4    do is go to the EPA Web site. And just like those other</p> <p>5    EPA papers I'm referring to, you can get them off the Web</p> <p>6    site; that you asked them if I cite them or not, well,</p> <p>7    they're on the web site. But anyway, you can go to EPA's</p> <p>8    Web site and you can see a map of what they found in the</p> <p>9    bark going from the mine all the way across Lake Koocanusa</p> <p>10   and they will give you concentration gradients going</p> <p>11   beyond the mine.</p> <p>12   Q. Right.</p> <p>13   A. So you can draw your own conclusions from</p> <p>14   that.</p> <p>15   Q. Okay. But your conclusions, based on your</p> <p>16   analysis, you would not purport to have taken a</p> <p>17   representative sample in this paper, correct?</p> <p>18   A. In this paper, we were starting at the mine.</p> <p>19   We wanted to -- we assumed that would have the highest</p> <p>20   level of contaminants. And then we worked our way away</p> <p>21   from the mine. That was the point.</p> <p>22   Q. Okay. It was not to say -- to speak or give</p> <p>23   conclusions about the forest as a whole, correct?</p> <p>24   A. Well, that's not entirely correct, no, because</p> <p>25   obviously, if you would -- if we find it, you know, we</p>	185

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<p style="text-align: right;">186</p> <p>1 even find half the concentration at the road so many miles 2 down from the mine, then we could assume that the forest 3 in the same circle around that same area could be 4 similarly contaminated.</p> <p>5 Q. Did you make any effort to randomly select or 6 select a representative sample of the trees that were in 7 the area off of the mine?</p> <p>8 A. Well, we tried to -- we basically tried to 9 sample in areas which we could easily access, since we 10 were all suited up and it's very difficult work.</p> <p>11 Q. Sure.</p> <p>12 A. And so, you know, that would be a good 13 question. And basically, we tried to collect samples from 14 areas moving down from the mine off roadways as far as we 15 could get, and we did try to, over time, have tried to 16 collect samples from representative tree species.</p> <p>17 How come you and I are the only ones interested in 18 this paper?</p> <p>19 Q. I think, I think it's fascinating. So, just 20 so I understand what you're saying: You start at the 21 mine, you move farther away all the way in town. However, 22 would you feel comfortable extrapolating these findings to 23 trees that were 5 to 10 miles due south of the mine?</p> <p>24 A. Well, I mean we didn't have the resources or 25 the manpower to do that sort of approach, so EPA took our</p>	<p style="text-align: right;">188</p> <p>1 correctly: 2 "The result of the railroad sample raises the 3 possibility that the transportation corridors through 4 which Libby vermiculite was hauled to other locations 5 throughout the United States may also be contaminated. 6 This suggests that similar studies of bark from trees near 7 vermiculite processing sites across the country could be 8 used to determine the extent of amphibole fiber 9 contamination in those locales."</p> <p>10 Did I read that correctly, sir?</p> <p>11 A. Yes.</p> <p>12 Q. And if I understand this correctly, you're 13 saying that because this Libby vermiculite was taken 14 across the country, it is possible that we would find 15 exposures had occurred that resulted in asbestos fibers 16 being deposited in trees far, far away from the Libby 17 mine, correct?</p> <p>18 A. Is what it's really saying is that, you know, 19 since we've done this work, this approach has been done in 20 other areas of the country. Back in New York, they've 21 used the same approach near chrysotile mines and used to 22 identify, you know, the dispersal of asbestos. So that's 23 what really this is saying, is that this can be used as an 24 approach to track where asbestos goes.</p> <p>25 Q. Right.</p>
<p style="text-align: right;">187</p> <p>1 -- basically what we found after we reported this to EPA, 2 then they did their sampling. They dropped people in by 3 helicopter and took samples on these lines going from the 4 mine.</p> <p>5 Q. Okay.</p> <p>6 A. In all directions.</p> <p>7 Q. So EPA's work, you believe, constitutes a more 8 representative analysis or -- let me rephrase that.</p> <p>9 The sampling done by EPA, in your opinion, was more 10 comprehensive in its attempt to sample a more 11 representative sample of the trees?</p> <p>12 A. Representative area around the mine, yes.</p> <p>13 Q. Right, okay. And I guess, you know, I don't 14 -- you're not purporting to do so here. I'm just trying 15 to make the record clear on this. This is not a paper 16 that is trying to take a number of samples and then 17 extrapolate those findings to the forest in general. 18 That's not what this paper seeks to do, correct?</p> <p>19 A. I don't believe we have enough samples to do 20 that.</p> <p>21 Q. Okay. That is just what I was trying to make 22 clear. Moving on to page -- well, staying on page 464, 23 I'll move back to the figures, in the "Conclusion," and 24 this is, I guess, the last two sentences on this page, I'm 25 going to read this, and let me know if I read this</p>	<p style="text-align: right;">189</p> <p>1 A. I think that's all it's saying.</p> <p>2 Q. Well, I guess the language I focused on, 3 though, was: "That the transportation corridors through 4 which Libby vermiculite was hauled to other locations 5 throughout the United States may also be contaminated."</p> <p>6 A. Yes.</p> <p>7 Q. And you agree with that statement?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. So it is quite possible that there are 10 forests outside of Lincoln County in which unexpanded 11 vermiculite was taken through that area and people who 12 engage in certain activities in that forest may be exposed 13 to asbestos, correct?</p> <p>14 A. Well, I don't like your use of the word 15 "forest." I mean we're talking about areas adjacent to 16 like a railroad track.</p> <p>17 Q. Okay. But trees near a railroad track, 18 correct?</p> <p>19 A. And I'll buy that one.</p> <p>20 Q. Okay. So let me start that over, then. Is 21 your opinion, then, that because unexpanded vermiculite 22 was sent all across the country, that it is quite possible 23 that there were releases of asbestos that were retained by 24 trees? Correct?</p> <p>25 A. Yes.</p>

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<p style="text-align: right;">190</p> <p>1 Q. And a person who engages in certain activities 2 around those trees may be exposed to asbestos from this 3 tree, correct?</p> <p>4 A. If they performed some activity that disturbed 5 the media, sure.</p> <p>6 Q. Okay. And this would be asbestos that came 7 from unexpanded vermiculite, correct?</p> <p>8 A. Yes, or, I guess, asbestos that came from 9 anywhere if it was transported through that area.</p> <p>10 Q. Right, right. Which unexpanded vermiculite 11 was, correct?</p> <p>12 A. Yes.</p> <p>13 Q. Okay. The same kind of unexpanded vermiculite 14 that was found around Libby, correct?</p> <p>15 A. Yes.</p> <p>16 Q. Okay. If we could move to Exhibit 4 again, 17 which was your harvesting simulations. Now, earlier you 18 corrected me when I made an ill-advised attempt to compare 19 bulk sampling to air samples, that those are not proper 20 data to compare, correct?</p> <p>21 A. Yes.</p> <p>22 Q. However, here we are now dealing with air 23 samples, correct?</p> <p>24 A. Yes.</p> <p>25 Q. And these are the kind of data that could be</p>	<p style="text-align: right;">192</p> <p>1 A. You may be able to, I guess, as long as we're 2 talking about that particular activity.</p> <p>3 Q. Okay. In this case, do you intend to offer 4 any opinions about individuals who have worked in some 5 type of logging capacity in the Lincoln County area with 6 respect to what their exposures may have been?</p> <p>7 A. Well, to me, the fact that all of this work 8 started because that's what we were originally proposing 9 was to study logging operations in Libby as a large scale 10 operation, and so we wanted to collect preliminary data, 11 so I guess from that standpoint, we were trying to 12 determine if there was a source of exposure from sawing up 13 wood, yes.</p> <p>14 Q. Okay. So the idea of determining whether 15 there's a source of exposure, is it fair to characterize 16 that as a preliminary undertaking?</p> <p>17 A. I think -- well, this says "preliminary" in 18 the title. I don't know if you read that or not.</p> <p>19 Q. Yes, yes. That's a good point. That's -- 20 okay. So at this stage, you are establishing the 21 existence of potential exposures, correct?</p> <p>22 A. Yes.</p> <p>23 Q. But you haven't reached a point of actually 24 trying to estimate a cumulative exposure that an individual has had who may have engaged in these</p>
<p style="text-align: right;">191</p> <p>1 compared to exposures that occur on a job site, correct?</p> <p>2 A. On a job site where they were sawing up 3 contaminated firewood?</p> <p>4 Q. Well, I mean even more generally. The 5 measurements you take of the activity simulated here, 6 those data measurements, those fiber-per-cc measurements, 7 those data could be compared to other types of 8 occupational exposures to asbestos when trying to assess 9 exposure level, correct?</p> <p>10 A. Well, just in, yeah, saying we've got this 11 level doing this activity and this level taking a chain 12 saw to a piece of wood; yeah, we can do that.</p> <p>13 Q. Okay.</p> <p>14 A. I don't know what it means. This was designed 15 to look at what happens if we start handling these trees.</p> <p>16 Q. Okay. But just so I understand, when we were 17 talking about Amandus earlier, we talked about how 18 exposure data was used as part of an epidemiological 19 study, correct?</p> <p>20 A. Yes.</p> <p>21 Q. And so presumably, to the extent that you have 22 this exposure data, were you to have information about the 23 duration or circumstances surrounding exposure, you could 24 develop a cumulative exposure for somebody if given the 25 right exposure history, correct?</p>	<p style="text-align: right;">193</p> <p>1 activities, correct?</p> <p>2 A. I have not.</p> <p>3 Q. Okay. Nor do you intend to offer an opinion 4 of that nature at the confirmation hearing, correct?</p> <p>5 A. That would be fair.</p> <p>6 Q. Okay. Now, did you take soil measurements 7 during the course of the sampling activities?</p> <p>8 A. For this paper, I don't believe so.</p> <p>9 Q. Okay. And some of the activities included 10 literally sawing trees over, correct?</p> <p>11 A. Yes.</p> <p>12 Q. Let me get a quick list of the activities just 13 so, you know, we're not -- I'm not speculating. Where's 14 -- I believe it's in the paper, but off the top of your 15 head, if not, what are the --</p> <p>16 A. Yeah, we basically had -- we tried to divide 17 up into people with different tasks. So we had a 18 chain-sawer; we had a person who would assist the 19 chain-sawer in getting the tree in position, clearing 20 brush; then we would have people that would move the sawed 21 material and stack it --</p> <p>22 Q. Which task --</p> <p>23 A. -- there were two of them.</p> <p>24 Q. Which task did you perform?</p> <p>25 A. I was the chain-sawer.</p>

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<p>1       Q. That's got to be the best job of the bunch.      2       A. It was.      3       Q. I think the mover got the short end of the      4 stick. No pun intended.      5       A. Well, I think the stackers. They were -- they      6 had to rope --      7           MR. LEWIS: Have you ever been, ever been on a      8 chain saw?      9           MR. STANSBURY: I have been on a chain saw.      10          MR. LEWIS: If you get on one of these big      11 chain saws, that's no bargain.      12          MR. STANSBURY: Oh, it's -- at least it's      13 enjoyable. I've also -- I've been on a chain saw and I've      14 shlepped wood around. And between the two, I'll take the      15 chain saw.      16          THE WITNESS: But the stackers had to walk,      17 you know. So they'd be walking and there'd be hills. I      18 think they had the worst job.      19          Q. (By Mr. Stansbury) Okay. And then once the      20 tree had fallen, you would also saw the branches off the      21 tree, correct?      22          A. Right.      23          Q. And so as you say, people are walking back and      24 forth throughout this process, correct?      25          A. Yes.</p>	<p>194</p> <p>1       fibers that were from the Libby mining vermiculite      2 operation as opposed to "naturally occurring asbestos,"      3 correct?      4       A. We just looked for Libby amphiboles.      5       Q. Okay. So the amphiboles that were identified      6 could have been from the bark of the tree, correct?      7       A. Yes.      8       Q. Could have been from the soil, correct?      9       A. Could have been.      10       Q. Okay. And could have just been naturally      11 occurring asbestos, correct?      12       A. But all asbestos is naturally occurring.      13       Q. Well, let me rephrase that, then: Naturally      14 occurring asbestos that was not originally released as      15 part of the Grace mining and milling operation, correct?      16       A. If it was there, it could have been that,      17 sure.      18       Q. Okay. Right, just making clear that you did      19 not attempt to differentiate, did you?      20       A. No.      21       Q. Okay.      22          MR. STANSBURY: I think we have 5 minutes left      23 on the tape, so why don't we take a quick break and then      24 we'll resume after that so he can change the tape.      25          VIDEOGRAPHER: This concludes Tape 3 of the</p>
<p>195</p> <p>1       Q. Trees are falling from an upright position      2 onto the ground, correct?      3       A. Yes.      4       Q. Kicking up whatever debris is on the ground,      5 correct?      6       A. Correct.      7       Q. And so, however -- and you're taking      8 measurements of personal breathing zones, correct?      9       A. Yes.      10       Q. You're also doing wipe measurements, correct?      11       A. Yes.      12       Q. Okay. However, with the personal breathing      13 zone measurements, you did not differentiate between      14 exposures that may have occurred from asbestos coming out      15 of the bark of the tree as opposed to asbestos coming out      16 of the soil, correct?      17       A. Out of the soil or people walking through      18 brush that wasn't associated. You know, you're walking      19 through brush, I mean like green - what's the word I'm      20 looking for - you know, green foliage.      21       Q. Right.      22       A. Yeah, we didn't account for that and we can't      23 account for that.      24       Q. Okay, okay. And similarly as we discussed      25 earlier, you haven't differentiated between asbestos</p>	<p>197</p> <p>1 videotaped deposition of Dr. Terry Spear.      2           The time is 1:07. We're off the record.      3           (A brief recess was taken.)      4          VIDEOGRAPHER: The time is 1:17. This is Tape      5 4 of the videotaped deposition of Dr. Terry Spear.      6           We're on the record.      7          BY MR. STANSBURY:      8          Q. Okay. Going back to Exhibit 4, I believe, if      9 we could turn to page 719.      10        MR. LEWIS: Seven -- excuse me?      11        MR. STANSBURY: Seven nineteen.      12        MR. LEWIS: Thank you.      13        Q. (By Mr. Stansbury) And Figure 1, location of      14 the 2006 harvest, firewood harvesting simulations      15 conducted off of Rainey Creek Road, near the former      16 vermiculite in the EPA-restricted zone near Libby Montana,      17 the distance from Highway 37 to the harvest locations was      18 1.5 kilometers.      19        Did I read that correctly?      20        A. Yes.      21        Q. So that, the harvest location, that's where      22 these samples were taken?      23        A. The harvest, yeah -- during this study, you      24 mean?      25        Q. Yes, sir.</p>

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<p style="text-align: right;">198</p> <p>1 A. Yes.</p> <p>2 Q. Okay. How many trees did you chop down in 3 total?</p> <p>4 A. I'm not sure how many trees we chopped down in 5 total. I mean we did -- I believe some of the trees were 6 partially down, some we felled. They're all standing 7 dead. We didn't cut any live trees.</p> <p>8 Q. You didn't cut any live trees at all?</p> <p>9 A. No.</p> <p>10 Q. Okay. If we could turn to Table 2 on page 11 721, this is TEM wipe sample results from three firewood 12 harvest simulation trials conducted in the Libby 13 EPA-restricted zone near Libby, Montana.</p> <p>14 Did I read that correctly, sir?</p> <p>15 A. Yes.</p> <p>16 Q. Okay. So it sounds like there were three 17 harvest trials. Is that what we were talking about 18 earlier, where you chop down the trees, cut them up, and 19 then haul and stack the wood?</p> <p>20 A. Well, a trial was basically over a given 21 period of time. See, we had to limit our time doing this 22 work because of the fact that, again, we were suited up 23 and it was summertime and we couldn't spend too much time 24 in these suits. So a trial would involve like a period of 25 time, 40 minutes - an hour, probably 40 minutes, and</p>	<p style="text-align: right;">200</p> <p>1 predict airborne releases given bulk measurements of 2 asbestos within bark?</p> <p>3 A. No.</p> <p>4 Q. Okay. You mentioned in this paper the 5 restrictive zone was once used for logging. Is that 6 correct?</p> <p>7 A. That was my understanding, yes.</p> <p>8 Q. What was the basis of that understanding?</p> <p>9 A. Oh, I think I've -- that's a matter of public 10 record. I believe the Forest Service may have told us 11 that. I think I've seen it in depositions. Yeah, I don't 12 have any doubts about that they were -- that there was 13 logging done off that road or nearby. Jackson Creek Road 14 comes in from the northeast side of that, or mainly the -- 15 I don't know if that's important or not, but -- (pause.)</p> <p>16 Q. Well, let's look at Table 1 for a moment.</p> <p>17 A. Okay.</p> <p>18 Q. Now, this is the --</p> <p>19 A. Table 1?</p> <p>20 Q. Yes, on page 720.</p> <p>21 A. Okay.</p> <p>22 Q. Now, this is the PBZ, the personal breathing 23 zone results, correct?</p> <p>24 A. Yes.</p> <p>25 Q. And the chain saw operator, which we've</p>
<p style="text-align: right;">199</p> <p>1 whatever trees we cut up during that time period would be 2 part of that trial. So we did that three different times.</p> <p>3 Q. Okay. And as this indicates by the title of 4 this table, this harvesting occurred inside the 5 EPA-restricted zone, correct?</p> <p>6 A. Yes.</p> <p>7 Q. Okay. And I believe on page 722 under 8 "Conclusion," the last paragraph of the left column, tell 9 me if I read this correctly:</p> <p>10 "The authors recognize that the 11 firewood-harvesting simulations presented in this study 12 represent near worst-case scenarios."</p> <p>13 Did I read that correctly, sir?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. So is it fair to say you would not 16 extrapolate any airborne release findings from this study 17 to similar activities that would occur elsewhere in and 18 around Lincoln County, correct?</p> <p>19 A. Correct, unless we knew the bark levels were 20 the same. But we don't know that, so you are correct.</p> <p>21 Q. Okay. Did you develop a method for predicting 22 the airborne release that would occur from a given bark 23 level?</p> <p>24 A. No.</p> <p>25 Q. Okay. Sitting here today, are you able to</p>	<p style="text-align: right;">201</p> <p>1 established was you, correct?</p> <p>2 A. Yes.</p> <p>3 Q. And "n = 3," that means -- what does that 4 equal?</p> <p>5 A. Number of samples we collected.</p> <p>6 Q. Okay, so number of airborne samples. How long 7 would you take each sample?</p> <p>8 A. I think it's stated in here somewhere. Again, 9 it seems like they were fairly short-term samples, less 10 than an hour.</p> <p>11 Q. And you then predicted a time-weighted average 12 for those samples?</p> <p>13 A. Well, these are sample time-weighted averages, 14 so these are just the concentrations for the sample time. 15 We didn't extrapolate the eight hours.</p> <p>16 Q. Okay. So what impact would extrapolating the 17 eight hours have on your findings?</p> <p>18 A. Well, if a person did chain-sawing the same 19 amount of time as we did and found the same results, and 20 then if we divided that by eight hours, it's going to go 21 down. I mean the concentration will be less. However, if 22 a person did this particular operation for eight hours, 23 then that would be the eight-hour time-weighted average.</p> <p>24 Does that make any sense? This is how we try to teach our 25 students.</p>

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<p style="text-align: right;">202</p> <p>1 Q. Right. I just want to make sure that, you 2 know, the record's clear and that I'm following it, too. 3 So the mean PCM sample TWA -- and TWA is a time-weighted 4 average, right?</p> <p>5 A. Yes.</p> <p>6 Q. It's 0.72 fibers per milliliter, which is 7 fibers per cc, right?</p> <p>8 A. Right.</p> <p>9 Q. Okay. And for the operator assistant, it was 10 0.26 fibers per cc, correct?</p> <p>11 A. Yes.</p> <p>12 Q. And the stackers, it drops to 0.07 and 0.12 13 respectively, correct?</p> <p>14 A. Yes.</p> <p>15 Q. And so the total mean for all tasks was 0.29 16 fibers per cc, correct?</p> <p>17 A. Right.</p> <p>18 Q. Okay. Now, do you have an opinion as to the 19 meaning of those findings or the importance of those 20 findings?</p> <p>21 A. Well, in my opinion, they aren't very 22 important because obviously, fibers per cc are just that, 23 fibers. You know, there's lots of fibers in the forest.</p> <p>24 Q. Right.</p> <p>25 A. We're talking about sawdust.</p>	<p style="text-align: right;">204</p> <p>1 Q. Okay. And so if we were to want to compare 2 these measurements with Amandus's data, we would use the 3 mean -- would we use the "Mean TEM Sample TWA greater than 4 5 microns" column?</p> <p>5 A. Well, I don't believe Amandus did any TEM. I 6 think it was all PCM.</p> <p>7 Q. PCM, right. How would the TEM and PCM 8 compare?</p> <p>9 A. Well, generally, we could expect -- I mean if 10 we're just talking about -- let's say we had nothing but 11 asbestos in this room floating around in the air, and if 12 we did PCM versus TEM, we'd see more with TEM because of 13 the greater magnification.</p> <p>14 Q. Okay.</p> <p>15 A. If you have a mixed, where you've got 16 different types of fibers -- see, TEM is only looking at 17 asbestos. So if we've got mixed fibers, then we may see 18 more with PCM. Does that make sense?</p> <p>19 Q. Okay. Why would we see more with PCM? 20 Because we wouldn't --</p> <p>21 A. Because it's going to count all fibers.</p> <p>22 Q. Right.</p> <p>23 A. So it's going to count the asbestos fibers as 24 well as the other fibers. Do you see what I'm saying? I 25 don't know if that makes sense.</p>
<p style="text-align: right;">203</p> <p>1 Q. So we haven't, at this point, reduced it to 2 asbestos fibers, correct?</p> <p>3 A. That's right.</p> <p>4 Q. Okay. What about the mean TEM sample TWA? 5 Are we then looking at actual asbestos fiber for these 6 measurements?</p> <p>7 A. Yes. These are structures per square 8 centimeter -- or per cubic centimeter --</p> <p>9 Q. And so the first --</p> <p>10 A. -- and broken down by, you know, length.</p> <p>11 Q. Okay. So there are two columns -- or three 12 columns of mean TEM data, the first of which measures 13 fibers less than 5 microns, correct?</p> <p>14 A. In length.</p> <p>15 Q. In length; in length, thank you. The second 16 column measures fibers greater than 5 microns in length, 17 correct?</p> <p>18 A. Yes.</p> <p>19 Q. And then the third column measures total 20 asbestos fibers irrespective of length, correct?</p> <p>21 A. Yes, but basically, it's kind of the 22 combination of the two.</p> <p>23 Q. Right. You're basically adding them together, 24 correct?</p> <p>25 A. Yeah.</p>	<p style="text-align: right;">205</p> <p>1 Q. I do. So I'm thinking back to the exposure 2 measurements that Amandus used which used PCM. The actual 3 asbestos present in the air for those measurements may 4 have been higher than what was measured -- than what was 5 reported, rather?</p> <p>6 A. Are we going back to the Amandus?</p> <p>7 Q. Yes, not focusing on the old pre '68 data. 8 I'm talking about like the data in the late '60s and 9 throughout the '70s through the '80s where they reported 10 in PCM fibers per cc.</p> <p>11 A. Well, if there were fibers present that were 12 non asbestos, that would be the case. I don't know if 13 that was true or not.</p> <p>14 Q. Okay.</p> <p>15 A. You know, and the other -- with PCM, you just 16 have to keep in mind that they're counting fibers, but for 17 one thing, PCM can only see a diameter of a fiber like 18 0.25 micrometers in diameter. So if there's real thin 19 fibers, we're not even going to see them under the 20 microscope, whereas with TEM, we would see it. So that's 21 kind of another reason why we might see more TEM fibers if 22 we had the same, the same asbestos atmosphere.</p> <p>23 Q. So is it fair to say that, and based on this 24 paper, one of the worst-case scenarios you would 25 anticipate in terms of exposure for a chain saw operator</p>

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<p style="text-align: right;">206</p> <p>1 would be 0.11 fibers per cc if we were to count all      2 fibers, including those shorter than 5 microns, correct?      3       A. Are we looking at the last column? Where are      4 we looking at?      5       Q. The last column, the chain saw operator.      6       A. Chain saw operator. So for that number of      7 samples, pretty limited number of samples, yeah, we found      8 that number.      9       Q. Right. And again, just so the record's clear,      10 this is what the paper states is a worst-case scenario of      11 potential exposure, correct?      12      A. Well, we called it "worst case" simply because      13 we felt that the mine would be most likely to have the      14 highest contamination. We were on the mine road.      15      Q. Right, right. So --      16      A. Is that worse than being somewhere else on the      17 mine road? I don't know.      18      Q. But in terms of being somewhere in Lincoln      19 County forest area using a chain saw, an area that is away      20 from the mine, you would not expect to see exposures      21 higher than this, would you?      22      A. If we knew that the concentration in the media      23 was less, yeah. We would assume that it would be less.      24      Q. You would assume it would be less, right.      25      A. But, you know, you can't make those</p>	<p style="text-align: right;">208</p> <p>1 question?      2           MR. LEWIS: But the answer is "no," he's not      3 going to be offering any testimony on that last subject.      4           (The record was read by the court reporter as      5 follows:      6           "QUESTION: But fair to say, you stated      7 earlier, at the confirmation hearing, you are not going to      8 offer an opinion about any specific individual's potential      9 exposures from having worked as a chain saw operator in      10 Lincoln County, correct?      11           "ANSWER: No.")      12          MR. STANSBURY: Is that a double negative?      13          MR. LEWIS: Yeah, it is.      14          MS. ROHRHOFER: I'm not an English major. I      15 think --      16          MR. LEWIS: You asked if it's correct that      17 he's not going to, and he said "no."      18          But anyway, he's not, just for the record,      19 he's not going to offer any testimony as to that last      20 question.      21          MR. STANSBURY: I'll ask him one more time.      22 BY MR. STANSBURY:      23          Q. You're not going to offer any -- is it correct      24 to say that you will not offer any testimony at the      25 confirmation hearing about an individual's potential</p>
<p style="text-align: right;">207</p> <p>1 conclusions unless you knew.      2       Q. But again, you would not extrapolate these      3 measurements to other parts of the forest without some      4 form of measurement done in advance, correct?      5       A. Right. And we haven't attempted to do that.      6       Q. Okay. So I just want to make sure the      7 record's clear that you were not stating based upon this      8 paper, you believe similar exposures are occurring      9 throughout the Lincoln County forest, correct?      10      A. Right. A very limited number samples, a pilot      11 study, preliminary data, the only thing we can say from      12 this study, basically, is that if you work on contaminated      13 trees, you can put fibers into the air or get them on your      14 clothes.      15      Q. Okay. And but fair to say, you stated      16 earlier, at the confirmation hearing, you are not going to      17 offer an opinion about any specific individual's potential      18 exposures from having worked as a chain saw operator in      19 Lincoln County, correct?      20      A. No.      21      Q. Okay.      22      MR. LEWIS: That's a double-negative, Counsel.      23 You asked -- I don't think you want the answer to stand as      24 stated.      25      MR. STANSBURY: Could you repeat the last</p>	<p style="text-align: right;">209</p> <p>1 exposures from sawing, hauling, or stacking wood in the      2 Libby forest?      3       A. That would be correct.      4       Q. Okay.      5       MR. STANSBURY: I appreciate you looking out      6 for me, Tom.      7       MR. LEWIS: Well --      8       MR. STANSBURY: That's good. You're right.      9       MR. LEWIS: It doesn't have any -- he's not      10 going to testify about that.      11      Q. (By Mr. Stansbury) And we stated earlier that      12 your 2009 paper was not in your expert report, correct?      13      A. Correct.      14      Q. And you don't intend to offer any testimony      15 related to that at the confirmation hearing, correct?      16      A. No.      17      Q. Okay. And again so the record's clear, we      18 looked through your report and although we did see      19 references where you were talking about medical findings,      20 you yourself are not a medical doctor, correct?      21      A. That's correct.      22      Q. You don't intend to offer any medical      23 testimony about asbestos disease, correct?      24      A. No.      25      Q. Okay. Nor are you a toxicologist, correct?</p>

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<p style="text-align: right;">210</p> <p>1 A. That's correct.      2 Q. You do not intend to offer opinions about      3 toxicity of amphiboles in Libby, correct?      4 A. Correct.      5 MR. LEWIS: Don't ask these questions over      6 again. Please don't. They're repetitive.      7 Q. (By Mr. Stansbury) Nor are you an      8 epidemiologist, correct?      9 A. Correct.      10 Q. You're not going to offer epidemiological      11 opinions, correct?      12 A. That's correct.      13 Q. Okay.      14 MR. STANSBURY: Pass the witness.      15 MR. LEWIS: Okay. Did we get -- what you      16 referred to as the "Amandus study", was that marked?      17 MR. STANSBURY: I believe it was.      18 MR. LEWIS: Is that 7?      19 MS. ROHRHOFER: Yeah, Exhibit 7.      20 MR. LEWIS: Okay, thanks. Let me check. I      21 probably don't have any questions.      22 (Pause in proceedings.)      23      24 BY MR. SPEAR:      25 Q. I guess I want to clarify one thing,</p>	<p style="text-align: right;">212</p> <p>1 Q. All right.      2 A. I mean I just know that because of our work      3 with the Forest Service, we had to have access to that      4 map. I mean we've, we've been working with EPA.      5 Q. And that's the Forest Service work that you're      6 engaged in right now that's not been completed --      7 A. Yes.      8 Q. -- is that correct?      9 A. Yes.      10 Q. All right. Do you know where that map can be      11 found?      12 A. I don't know what you mean. I have it, the      13 Forest Service has it, EPA has it. I don't know if      14 they've released the map.      15 Q. Okay.      16 A. I just don't know. I'm just being honest with      17 you, I don't know.      18 Q. Okay.      19 A. I mean it isn't in a publication because we      20 don't, we don't know if we have the right to put that in      21 there.      22 Q. And you do not, is it -- I don't know if you      23 testified about this: Do you or do you not intend to rely      24 on that map for your testimony in this case?      25 A. Well, to me, it described the spread of</p>
<p style="text-align: right;">211</p> <p>1 Dr. Spear. The EPA studies that you considered, you      2 referred to some studies by Paul Peronard. Do you recall      3 that?      4 A. Yes.      5 Q. Are those studies that you referenced all      6 publicly available?      7 A. Yes. They're on the EPA Web site, I believe.      8 Q. Is that how you obtained them?      9 A. Yes.      10 Q. Okay. And does that include the bark studies      11 and the map prepared by the EPA? Is that on the Web site      12 as well?      13 A. That's a good question.      14 Q. Do you know when that study and that map was      15 made available to the public or -- let me finish. Let me      16 withdraw the question.      17 Do you know when that EPA study, the bark study and      18 the map that you described, was issued by the EPA?      19 A. My recollection is it was in 2008.      20 Q. Do you know if it was before or after your      21 report?      22 A. Before or after this report.      23 Q. Your expert report.      24 A. My expert report. I guess I don't know the      25 exact timeline.</p>	<p style="text-align: right;">213</p> <p>1 asbestos from the, from the mine. But I don't -- I      2 haven't offered it as an opinion, so I just brought it up      3 in the case of cross-examination, so I probably wouldn't      4 rely on it.      5 Q. Okay. You, in your report --      6 MR. LEWIS: Excuse me, Counsel.      7 Q. (By Mr. Lewis) I'll refer you to Exhibit 4.      8 You talk about a harvest location.      9 A. Looking at the map?      10 Q. Yes, it's Figure 1 on page 719.      11 A. Okay.      12 Q. I want to clarify. The harvest location was      13 not on the mine site. Is that true or untrue?      14 A. That is true.      15 Q. Okay. Do you know where the screening, what      16 has been called the "screening plant" is located on the      17 Kootenai River?      18 A. By the -- yes.      19 Q. Okay. Is that at the intersection of the      20 river and Rainey Creek Road?      21 A. Yes.      22 Q. How far was the harvest location from the      23 screening plant?      24 A. Well, what did we say -- whatever the distance      25 was given up that road. I think we state 1.5 kilometers.</p>

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<p>214</p> <p>1 Q. Okay.      2 A. From Highway 37, so we add another --      3 Q. So less than a mile?      4 A. Yes.      5 Q. Okay. That's all I have.      6 MR. LEWIS: I'll reserve the rest of my      7 questions in time of -- until the confirmation hearing.      8      9 BY MR. STANSBURY:      10 Q. Just one quick clarifying point. The harvest      11 location was not on the mine, but it was in the      12 EPA-restricted zone, correct?      13 A. Yes.      14 Q. Okay.      15 VIDEOPHOTOGRAPHER: Anybody else on the line?      16 Everybody done?      17 MR. LEWIS: Are there any questions?      18 MR. STANSBURY: Going once, twice. All right,      19 everybody.      20 VIDEOPHOTOGRAPHER: Okay. This concludes the      21 videotaped deposition of Dr. Terry Spear in the matter of      22 W.R. Grace &amp; Company, et al., Debtors.      23 The time is 1:37. It's July 29, 2009.      24 We're off the record.      25 * * * * *</p>	<p>216</p> <p>1 DEPOSITION OF: TERRY M. SPEAR, Ph.D.      2 DEPOSITION DATE: JULY 29, 2009      3 IN RE: W.R. Grace &amp; Co, Debtor      4 COURT REPORTER: CANDICE L. NORDHAGEN      5 I have read my deposition and make the following      corrections or additions:      6      7 PAGE # LINE CORRECTION      8      9      10      11      12      13      14      15      16      17      18      19      20      21      22 Signed under penalty of perjury this _____ day of      _____, _____.      23      24      25 Terry M. Spear, Ph.D.</p>
<p>215</p> <p>1 STATE OF MONTANA )      2 : ss.      3 County of Silver Bow )      4      5 I, Candice L. Nordhagen, Registered Professional      6 Reporter, Notary Public in and for the County of Silver      7 Bow, State of Montana, do hereby certify:      8      9 That the witness in the foregoing deposition, Terry      10 M. Spear, Ph.D., was by me first duly sworn according to      11 law in the foregoing cause; that the deposition was then      12 taken before me at the time and place herein named; that      13 the deposition was reported by me in machine shorthand and      14 later transcribed by computer, and that the foregoing two      15 hundred fourteen (214) pages contain a true record of the      16 witness, all done to the best of my skill and ability.      17 IN WITNESS WHEREOF, I have hereunto set my hand and      18 affixed my notarial seal this _____ day of _____,      19 2009.      20      21 _____      22 Candice L. Nordhagen      23 Notary Public for the State of      24 Montana residing at Butte,      25 Montana. My commission      (NOTARIAL SEAL) expires September 15, 2011.</p>	

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